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BULLETIN

OF THE

NTERNATIONAL RAILWAY CONGRESS

ASSOCIATION

(ENGLISH EDITION)

[385. (06 112]

THIRTEENTH SESSION

Paris, 1-12 June 1937.

GENERAL PROCEEDINGS

3rd Section : **WORKING.**

INAUGURAL MEETING

June 2nd, 1937.

PROVISIONAL CHAIRMAN : MR. LE BESNERAIS,

VICE-PRESIDENT OF THE PERMANENT COMMISSION OF THE ASSOCIATION.

— The Meeting opened at 9.0 a. m.

The Chairman (in French). — Gentlemen, the Permanent Commission has requested me to preside over the inaugural meeting of the Third Section. I cannot pass over in silence the pleasant memories I have of my collaboration with the work of this Section when I presided over it at the Madrid Congress, in 1930.

As a result of the experience obtained at previous Sessions, I would like to call your attention to certain guiding principles in order to facilitate the work of the Section.

First of all I would ask the Delegates to make their remarks as concise as possible and avoid a repetition of details already given in the reports published on the different questions. Our primary aim is to elucidate these reports, and agree or reject the summaries given therein.

There is another important question : that of translating the remarks during the discussions. Such a translation is not always required. In fact when the

majority of, or all, the members present have understood what has been said, it would be good practice not to demand a translation, in order to speed up the discussions. This avoids repetitions and loss of time. Also, translations sometimes cause one to lose the thread of one's ideas. So I recommend that they should only be asked for when absolutely necessary. Will those who want a remark translated, please ask for it immediately, as anyone who has failed to understand any statement is inclined to give up following the discussions. This is a question of discipline to which each of us must rigorously adhere.

I would also ask the members taking part in the discussions to give in their registration numbers, to assist the secretaries in their work and thereby avoid mistakes which are always a nuisance, though involuntary.

I now want to present to you in the name of the Permanent Commission, as President of the Third Section, Mr. PELLARIN, Manager of the French Est Railways, who, I am sure, will direct your work in the best possible way owing to his great practical experience of railway operating. *(Applause.)*

— *Mr. Pellarin takes the Chair as President.*

The President (in French). — I want to thank Mr. Le Besnerais for his very kind remarks about me.

Gentlemen, in order to complete the Bureau of the Section, I propose we elect as *Vice-Presidents :*

Messrs J. A. VALENTIN, District Manager, Swedish State Railways;

M. YOYITCH, Assistant General Manager Jugoslavian State Railways, Member of the Permanent Commission of the Association;

F. STOCKINGER, President, Austrian Federal Railways;

E. MATTER, Chef principal de l'Exploitation, Swiss Federal Railways (replacing Mr. H. Etter, Member of the General Management of the same Administrations) (*);

and as *Principal Secretary :*

Mr. J. VAN RYN, Engineer, Belgian National Railways Company.

— *These proposals were unanimously agreed.*

The Section, on the suggestion of the *President*, then elected the remaining officials and drew up a provisional agenda.

— The Meeting was then closed.

Revision of the Rules and Regulations of the International Railway Congress Association.

— The Meeting was resumed at 9.30 a. m.

The President (in French). — Gentlemen, according to our agenda we must

(*) Mr. Etter, who had been appointed by the Permanent Commission a Vice-President of the 3rd Section, had, for private reasons, requested the President, Mr. PELLARIN, to let Mr. MATTER take his place, adding furthermore that the latter gentleman was particularly competent to deal with the subjects to be discussed.

meet together with Section II for a joint examination of Question IV. Before doing so, however, we are asked to express our opinion on the proposed modification of clauses 2 and 4 of the Rules and Regulations of the Association, the text of which has been put before you (*).

Mr. Le Besnerais, *Vice-President of the Permanent Commission* (in French). — Gentlemen, I think it would be as well to give you a brief explanation of the reasons why the Rules and Regulations have to be revised.

The procedure as laid down formely was an extremely lengthy affair, seeing that the Permanent Commission could only alter the list of members of the Association provisionally, and their decision had to be ratified at the next Session. Consequently, the matter could only be settled after the next Congress, which often meant a delay of several years.

We thought it would be advisable to be able to speed things up, by allowing the list of countries belonging to the Association to be altered by a written vote, three quarters of the total number of members being required for a majority. In this way there need no longer be too long a delay in admitting new members, and this is the reason for the suggested modification.

The President (in French). — I hope that the Section will agree to the proposed alterations. *(Agreed.)*

In addition, in conformity with clause 21 of the Rules and Regulations, we have to appoint a delegate to attend the Meeting of the Permanent Commission for examining the revision in question.

I suggest that we nominate for this purpose Mr. Yoyitch, Assistant General Manager of the Jugoslavian State Railways, and Vice-President of this Section. *(Applause.)*

The Meeting was then closed and the Section met together with Section II for the discussions on Question IV

(*) See wording of the proposed alterations in the September 1937 number of this *Bulletin*, p. 1962 (Summary of Proceedings, Paris Congress, 1937), and revised Rules and Regulations in the January 1938 number, p. 98.

QUESTION VII.

Economical operation of the main line systems' secondary lines. Various methods adopted to adjust the operating facilities, safety, measures, and station organisation, to the volume of traffic.

Preliminary documents.

Report (France and Colonies, Belgium and Colony, Luxemburg, America, China and Japan), by Messrs. GRANDJEAN and GILMAIRE. (See *Bulletin*, October 1936, p. 999, or separate issue No. 2.)

Report (Italy, Spain, Portugal and Colonies, Switzerland, Austria, Hungary, Czechoslovakia, Jugoslavia, Bulgaria, Rumania, Greece, Turkey, Egypt), by G. C. PALMIERI. (See *Bulletin*, November 1936, p. 1129, or separate issue No. 5.)

Report (Germany, Great Britain, Dominions and Colonies, Denmark, Finland, Norway, Netherlands and Colonies, Poland and Sweden), by T. EMERS. (See *Bulletin*, November 1936, p. 1183, or separate issue No. 6.)

Special Reporter : G. C. PALMIERI. (See *Bulletin*, June 1937, p. 1538.)

SECTIONAL DISCUSSION.

Meeting held on June 4th 1937.

MR. PELLARIN IN THE CHAIR.

— The Meeting opened at 9.30 a.m.

The President (in French). — Gentlemen, to-day we begin to carry out the programme for Section III properly speaking with the discussions on Question VII. I want the delegates to make their remarks as consicely as possible, so as to facilitate the work.

I will first call upon Mr. Palmieri, the Special Reporter.

Mr. Palmieri, *Special Reporter* (in French). — Gentlemen, the question with which we have to deal this morning has been covered by three reports. I will merely recall the main points thereof.

The first problem is the definition of what is a secondary line. The railways in general are not unanimous about such a definition. In certain countries secondary lines are taken to be those officially classified as such by the public authorities. Other Railway Companies count as secondary lines all lines with little traffic. I myself think it is a question of nomenclature, and everyone will agree that by secondary lines we must understand lines with little traffic.

The operation of secondary lines must be economical; endeavours must be made to reduce the expenses to the minimum. This does not mean that every measure taken should bring about a reduction in expenditure; the services also must be improved, the better to meet the requirements of the public, and thereby attract to the railway the traffic lost through competitive transport methods.

Amongst the measures likely to assure economic operation of lines with little traffic are the following : above all the methods of transport used must be suitable for light traffic, and as far as possible must be those costing little; on the other hand, the operating regulations in force on the main lines must be simplified, because these same regulations are generally applied to the secondary lines. We should also make the safety measures less stringent, require less inspection of the track, fewer level crossings with keepers, and also reduce the number of times rolling stock used exclusively on secondary lines has to be overhauled.

The station, commercial, and accountancy services should also be organised on economical lines.

As regards the first point : economical transport methods, many railways have found it advisable to introduce smaller trains, known as « light trains » hauled by light-weight locomotives. Other railways have put railcars into service, either as single units or coupled together. Railcars have given satisfactory results, thanks to their high speed and because they make it possilbe to increase both the number of trains and the number of stops when they are used.

If we consider the safety measures, we must note the suppression whenever possible of level crossing keepers. When there is much traffic on the road and the visibility is good, the crossings are protected by various warning devices.

Technical operation has been simplified in nearly all cases. As a general rule the traffic control has been centralised either in selected stations, or in control stations and dispatching offices. This measure has made it possible to hand over the management of unstaffed stations or secondary stations to private individuals, but only as far as the commercial side is concerned. Finally the commercial services and accountancy have also been centralised.

The organisation of the services on secondary lines varies considerably from one country to another; it must of necessity be adapted to the traffic and economic conditions of the country concerned. These conditions vary a great deal, so that it is very difficult to formulate detailed and precise summaries. It would therefore seem to be advisable to limit ourselves to reporting what is done in each country, but it is very difficult, if not impossible, to apply the same rules to the majority of countries.

The President (in French). — After this general resume of the question, we will at once pass on to an examination of the Summaries. Will Mr. Palmieri please read Summary 1.

Mr. Palmieri (in French). — *Summary 1 :*

1. The organisation of the different services on secondary lines should have as its aim the reduction of operating expenses to a minimum.

The fact should not be overlooked, however, that it is essential to improve the service as much as possible in order to meet the requirements of the public and recover,

at least partly, traffic lost to road competition.

Mr. Barata, *Portuguese Railways Company* (in French). — While congratulating the Special Reporter on his remarkable report, I must say I do not think he has given a sufficiently precise definition of secondary lines. For example, I might quote the Jessi to Betowa line, which is equipped with very up-to-date plant and has to work a very dense traffic; in my opinion, from the technical point of view, this line cannot be classified as a secondary line.

The statement that secondary lines are those carrying little traffic does not seem a very happy definition to me. There are some secondary lines equipped with very up-to-date plant which consequently should not be included amongst the secondary lines with which we are dealing here. I would like a precise definition of what is to be understood by secondary line.

Mr. Palmieri (in French). — I must point out to Mr. Barata that the question of the economic operation of the secondary lines of main-line systems should not be mixed up with that of isolated secondary lines belonging to private companies.

Mr. Barata (in French). — The line to which I alluded is a private line which does not belong to a main-line system. Lines with little traffic belonging to main-line systems cannot be compared with secondary lines. There are certain private lines equipped to deal with traffic which may sometimes be extremely dense, but which are nevertheless not considered as main-line system lines.

Mr. Palmieri (in French). — Summary 1 might be given a more precise meaning if the first paragraph were made to read : « The organisation of the different services on secondary lines of *main-line systems* should have as its aim the reduction of operating expenses to a minimum ».

Mr. Barata (in French). — I agree.

The President (in French). — Has anyone else anything more to say about Summary 1?

Mr. Grandjean, *Reporter* (in French). — I want to make a little remark about the wording of the second paragraph which lays down that the railways should endeavour to improve the services they better to meet public requirements. On the Alsace-Lorraine Railways our policy in recent years has been to make no improvements on the small secondary lines. This attitude can be justified by the fact that we have embarked upon a policy of co-ordination; we have tried to substitute road services for railway services. We have avoided giving the public railcar services which might attract them to the railway, and so give rise to difficulties the day we wanted to replace the railways by motor services. Summary 1 applies to the secondary lines of main-line systems whose traffic must be worked by rail.

The President (in French). — This is a special case . When the line will eventually be abandoned, there is no need to be solicitous about it.

Mr. Matter, *Vice-President* (in French). — It seems to me that in these reports it is mainly a question of passenger traffic; I think the goods services have been neglected. Perhaps we will have occa-

sion to return to the question of the traffic itself, but so that there shall be no mistake I suggest inserting in the second paragraph of Summary 1 after the word « service » a reference not only to passenger traffic but also to goods traffic, it being understood that the word « goods » covers not only inert matter but also livestock and all the other kinds of transport that come under the heading « goods traffic ».

Mr. Palmieri (in French). — Mr. Matter's recommendation might be taken into account by inserting in the second paragraph of Summary 1 : « The fact should not be overlooked, however, that it is essential to improve the service of both passenger traffic and goods traffic of all kinds as much as possible in order to recover, at least in part, traffic lost to road competition. »

Mr. Yoyitch, *Vice-President* (in French). — I would like to point out that the wording of Summary 1 makes no allusion to the reduction of the number of times rolling stock used exclusively on secondary lines is examined.

Mr. Palmieri (in French). — This matter will be dealt with later on.

The President (in French). — As no one else wishes to say anything, I will read the modified text which takes the various remarks made into account :

« 1. The organisation of the different services on secondary lines of main-line systems should have as its aim the reduction of operating expenses to a minimum.

« The fact should not be overlooked, however, that it is essential to improve the service of both passenger traffic and goods traffic of all kinds as much as possible in order to recover, at least in part, traffic lost to road competition. »

— *Adopted.*

Mr. Palmieri (in French). — *Summary 2 :*

2. The possibility of reducing the expenses must be sought in the field of technical installations, in the domain of the methods of transport and in the adoption of simplified operating methods.

The President (in French). — Any remarks?

Mr. Level, *Compagnie Générale de Voies ferrées d'intérêt local, France* (in French). — Just now I heard Mr. Grandjean, of the Alsace Lorraine Railways, state that his Company was taking no steps to improve the service on certain lines because it was their intention to abandon these lines eventually; this looks like bartering. May I draw the attention of the delegates to the fact that the public dislike such barter; they do not wish to see the railway abandoned, but want to have both omnibus and railway services.

Amongst the measures likely to reduce the expenses of main-line systems, what about following the example of certain railways who, to save themselves the cost of working certain lines which always showed a deficit, have handed them over to local railway companies. Such companies, as you know, are able to work more economically; their solution of the problem is different from that of the main-line railways, as regards staff, signalling, rolling stock, railcars, etc. Consequently it would seem to be as well to quote amongst the measures likely to reduce expenses that of transferring certain lines to local railway companies, es-

pecially as this has been done with good results on certain systems. If you will allow me, I will read you an addition which could be inserted as a second paragraph to Summary 2 : « This possibility of reducing the expenditure may also be sought, in certain cases, in the handing over of lines, belonging to main-line systems and carrying little traffic, to secondary railway companies, whose operation is more flexible and less costly ».

Mr. Palmieri (in French). — I would like to point out to Mr. Level that the question we are now considering relates to the operation of the secondary lines of main-line systems who consider it advisable to operate such secondary lines themselves. It is not a question of giving up such lines, but rather of considering what measures will enable us to continue operating them ourselves. Consequently the question raised by Mr. Level seems to be outside our business.

Mr. Level (in French). — I do not think this question is not cognate. Mr. Palmieri himself has admitted that some of the secondary lines of the main-line systems are looked upon as lines that should be given up. I cannot see why my suggestion should be taken as being outside the question now being discussed.

The President (in French). — We must agree about this matter. Mr. Grandjean spoke about the question of co-ordination in France. There is no need to dwell thereon. The question we are studying, as the Special Reporter has pointed out, is the way the secondary lines should be operated by the main-line railways. The wording of the question clearly states « Economical operation of the main-line systems' secondary lines » and the end of Summary 2 gives as one way of reducing expenditure... « the adoption of simplified operating methods ».

Mr. Giovene, *Italian State Railways* (in French). — The sub-title of the question makes it clear that Mr. Level's point must be excluded. In fact the complete text of Question VII states : « Economical operation of the main-line systems' secondary lines. Various methods adopted to adapt the operating facilities, safety measures, and station organisation to the volume of traffic. »

We must keep to this heading. Solutions lying outside the scope of the question must be left aside.

Mr. Matter (in French). — I suggest a slight alteration to Summary 2 by suppressing the word « soit » in the French text, where it occurs three times, which would give the following wording :

« La possibilité de réduire les dépenses doit être recherchée sur le terrain des installations techniques, dans le domaine des moyens de transport et dans l'adoption de méthodes d'exploitation simplifiées ».

Mr. Palmieri (in French). — I see no objection to Mr. Matter's suggestion and I willingly support it.

The President (in French). — Summary 2 will therefore read as follows

« 2. The possibility of reducing the expenses must be sought in the field of technical installations, in the domain of the methods of transport and in the adoption of simplified operating methods. »

— *This text was adopted.*

Mr. Palmieri (in French). — *Summary 3 :*

3. Technical installations should be adapted to actual traffic requirements and not require any costly upkeep.

Simplification of signalling, and even elimination of signals where possible, simplification of the operation of points and other appliances, discontinuation of guarding at certain level crossings, are all measures frequently adopted, which can be recommended with a view to effecting savings.

Mr. Matter (in French). — May I suggest that in the first paragraph of the French text after the word « trafic » we put the word « exploitation » : « Les installations techniques doivent être adaptées aux nécessités réelles du trafic *l'exploitation* et n'exiger aucun entretien onéreux. »

Mr. Palmieri (in French). — I think the French wording is sufficiently explicit. I think the word « trafic » covers everything, even the operating so that there is no need to add « *d'exploitation* » in the French text. Perhaps the German text needs altering. The German delegates should decide it it does.

The President (in French). — The Secretaries will improve the German text; as for the French text, the meaning is quite clear (1).

Mr. Barata (in French). — I agree with the proposed summary. However I should like some further information. The simplification of the signalling and technical equipment has been solved in different ways in various countries. I would like some more information about it.

Mr. Palmieri (in French). — By « simplification of the signalling » I meant to say that nearly all countries and nearly all railways have endeavoured to reduce the number of signals; in certain cases, fixed signals have been suppressed, especially in stations where no shunting is carried out, or where there are no train crossings.

In many countries the distant signals have been removed, seeing that the speed was not very high, when the visibility of the stop signal is sufficient. This simplification results in savings on installations and maintenance and has given good results.

The President (in French). — If no one else has anything to say, we will adopt Summary 3 as worded by the Special Reporter, i. e. without adding the word « d'exploitation » suggested by Mr. Matter.

Mr. de Ruffi de Pontevès, *Ministry of Public Works, France* (in French). — I also agree with the Special Reporter's text.

— *Summary 3 was adopted without alteration.*

Mr. Palmieri (in French). — *Summary 4 :*

4. Substitution of more economical methods of transport for steam trains is one of the essential conditions for reducing expenses. From this standpoint, the use of railcars, when traffic conditions, either passenger or goods, are not against it, gives appreciable advantages.

I think it might be as well to make the beginning of this paragraph a little more precise. When speaking of « the substitution of more economical methods of transport for steam trains » naturally it means ordinary steam trains. Perhaps it would be as well to state this explicitely to avoid any misunderstanding.

(1) The English wording remained unaltered.

Mr. de Spirlet, *Nord-Belge Lines, and Chimay Railway, Belgium* (in French). — Actually the Special Reporter wished to make in Summary 4 a synthesis of Summaries 5 and 6. Summary 4 is rather conceived in the same spirit as Summary 5. Moreover, Summary 4 takes little account of the summaries formulated by Messrs. Grandjean and Gilmaire, who stated in that part of their report dealing with Belgium that the Belgian National Railways Company has maintained light steam trains on its secondary lines to the exclusion of railcars.

Mr. Palmieri (in French). — As Mr. de Spirlet has just remarked, Summary 4 is indeed a synthesis of Summaries 5 and 6. I intended to explain more precisely in Summaries 5 and 6 the brief statement made in Summary 4. Summaries 5 and 6 are worded as follows :

5. Railcars have undergone a very rapid development which is worthy of being followed up. Owing to their low cost price they have made it possible to considerably increase the commercial speeds, to increase the train frequency and the number of stops, etc., in fact to greatly improve the working on secondary lines.

It is desirable, however, that railcars can be coupled up, and run as twins, or be able to haul one or two trailers.

6. Reduction of the train weight is another factor of economy. The use of light and short trains is a step strongly to be recommended. It is also advisable to restrict the number of classes on passenger coaches by abolishing first class and, where possible, also second class.

Careful use of the useful loading capacity of goods wagons is another means of effecting economies.

Mr. de Spirlet (in French). — There is one way of solving the problem : by replacing in the text of the summary « one of the essential conditions » by « one of the possible ways », which is less absolute.

Mr. Latrasse, *French Nord Railway* (in French). — The first sentence of the summary is, in fact, exclusive. It seems to recommend substituting something else for steam trains. It seems incompatible with the solution given in Summary 6, which refers to light steam trains. Consequently we should not speak about « substituting more economical methods of transport for steam trains. »

The President (in French). — The Special Reporter has just made the original text more definite by saying « ordinary steam trains » instead of « steam trains ». Obviously he is not excluding the steam train, since he mentions it in Summary 6.

Mr. Latrasse (in French). — In my opinion the second sentence of Summary 4 could be included in Summary 5.

Mr. Gilmaire, *Reporter* (in French). — In the summaries to the report we drew up, Mr. Grandjean and myself, we mentioned first of all light trains. They were used long before railcars, and they will still have a part to play, especially as Mr. Matter pointed out, in the matter of goods traffic. I suggest we return to the expression « light trains » and refer the question of railcars to summary 5.

The President (in French). — Yes, we might adopt this suggestion.

Mr. Tuz, *Polish State Railways* (in French). — As Summaries 4, 5 and 6 seem to complete each other, I would like to express my opinion on Summary 6.

The recommendation to use « light and short trains... » must be considered

as a defensive measure against motor competition, but this measure may, in certain cases, result in increased operating costs. As the organisation of the services on secondary lines should have as its object the reduction of expenses, the organisation of light trains should not be strongly recommended, as it depends on the local conditions of each secondary line.

As regards « the utilisation of the useful loading capacity of goods wagons » this is a measure every railway should apply. It is unnecessary to especially recommend this measure in the case of secondary lines.

Consequently I suggest we delete from Summary 6 the reference to light trains, as well as the reduction in the weight of the trains and the utilisation of the useful loading capacity of goods wagons, and only retain the limitation of the number of classes for passengers, by abolishing the first class.

The President (in French). — The Special Reporter will read a text which takes into account the various observations made.

Mr. Palmieri (in French). — To satisfy the delegates who have raised objections, I suggest the following wording for Summary 4, in which we will delete the word « steam ».

« 4. Substitution of more economical methods of transport for ordinary trains is one of the essential conditions for reducing expenses. From this standpoint, the use of light trains or railcars, when traffic conditions, either passenger or goods, are not against it, gives appreciable advantages. »

Mr. Barrington-Ward, *London and North Eastern Railway.* — I notice that insufficient account was taken of the experiments made in England with « push and pull » trains. The tests carried out with railcars have not always been successful, but the use of « push and pull » trains (reversible sets with the locomotive in the middle) gives better results as it obviates all shunting when changing the running direction, and affords some advantages as regards the use of the locomotives. I therefore wish that this operating method be mentioned in the summaries.

Mr. Tuz (in French). — In Summary 4, I think mention should be made of the fact that the use of railcars for passenger services leads to considerable economies. On the other hand, I think the results would be different in the case of goods services. I suggest that we delete, therefore, in the new wording of Summary 4, the reference to light trains, and only mention the use of railcars for passenger traffic.

The President (in French). — I see there is lack of unanimity as regards light trains and railcars. It would be a mistake to give in the summaries a formula excluding one or other of these methods of transport, since in some cases the light train is more satisfactory than the railcar, and vice versa.

The formula suggested by the Special Reporter, which only gives the measures that can be recommended, either light trains or railcars as the case may be, is the only one, it seems, which will fully satisfy the Meeting.

In this formula, the partisans of the light train will find their preference is not excluded, and the partisans of the railcar will find their system is mentioned likewise.

We might moreover introduce a reference to light trains with the engine in the middle, as well as simplified ways of driving, to reduce the number of men employed.

We will therefore reconsider the text of Summaries 4, 5 and 6 from this aspect, as these summaries, as has been stated, should be discussed together, as any remark made about one of them might affect the wording of the others. Does anyone want to say anything about Summary 5 as just read?

Mr. Giovene (in French). — I think I should draw the attention of the Section to a very important point, from the economic point of view : the question of one-man driving.

In Italy, trials are being carried out with a hundred units. After these trials will have been completed, we will know the conditions that must be satisfied in driving, and stopping the train should the driver fail, by the method known as « the dead man's handle ». It would be as well to refer to this question at the end of summary 5, by saying :

« As regards savings on the driving staff, mention may be made of one-man operation in conjunction with some appliance to stop the train should the driver fail to perform his duty. »

Mr. Dreyfus, *Midi Railways, France* (in French). — In my opinion we should alter the text of Summary 5, saying : « Owing to their low cost price... ». I think this expression is too categorical.

Mr. Matter (in French). — In connection with the point raised by Mr. Giovene, I would like to call attention to the fact that in Switzerland trials are being made with one-man operation, where the driver also checks the tickets on the train. Obviously this system can onl be used on certain trains, when the num ber of passengers is more or less known As a rule the results are satisfactory, bu I must add that on certain days, Sun days and market days, for example, ther has to be a second man to cope wit the much greater number of passengers

Mr. Barrington-Ward. — The questio of single-man operation has been closel investigated in England. However, th staff are strongly opposed to its applica tion.

The President (in French). — Sum mary 5 might be worded as follows t satisfy everyone :

« Light trains should be made up wit the object of realising economical oper tion and utilisation. (For example « pus and pull » trains driven from either en and locomotives fitted for one-man ope ation). »

A delegate (in French). — « One-ma operation » does not seem essential me. The same result can be obtaine by putting a traffic man on the engin There are then two men, one a locomoti man and the other a traffic man.

The President (in French). — In th case there is only one locomotive ma

The same delegate (in French). - Yes, but there are two men on the trai

The President (in French). — Perha there is some drawback in stating th locomotives can be adapted to one-m operation. There is one serious dif culty : there is the locomotive and t brake van.

Mr. Gilmaire (in French). — The P ris-Orléans Railway has fitted on the te

er of locomotives which can be worked y one man, small look-outs, 90 cm. by 0 cm. (2' 11 1/2" × 2' 11 1/2") where- ı the train guard stays.

The same delegate (in French). — here is therefore a traffic man assisting ıe driver; this is no longer one-man peration.

The President (in French).— By mak- ıg provision for a man on the tender, ve meet the question of « one-man oper- tion. » If there were two men, we could ot do so.

I am now going to read the suggested ext for Summaries 4, 5 and 6 once ıore :

« 4. Substitution of more economical ıethods of transport for ordinary trains ; one of the essential conditions for re- ucing expenses. From this standpoint, ıe use of light trains or railcars, when affic conditions, either passenger or oods, are not against it, gives appreciа- le advantages.

« It is also advisable to restrict the umber of classes in passenger coaches y abolishing first class and, where pos- ble, also second class.

« 5. Light trains should be made up ith the object of realising economical peration and utilisation. (For example push and pull » trains driven from ther end, and locomotives fitted for ıe-man operation.)

« 6. Railcars have undergone a very pid development, which is worthy of ing followed up. They have made it ssible considerably to increase the mmercial speeds, to increase the train equency and the number of stops; in t to greatly improve the working on condary lines.

« It is desirable in certain cases that railcars should be capable of being coupled together or of pulling one or two trailers. »

— Summaries 4, 5 and 6 were adopted in this form.

Mr. Palmieri (in French). — We will now go on to summary 7 :

7. From the point of view of technical operation, it is recommended to simplify traffic regulations to the largest possible extent, and reduce the number of operations requiring the presence of operating employees. For this purpose, certain Railways have found it advisable to centralise the train control duties in selected stations or in dispatching offices.

Mr. Latrasse (in French). — The Special Reporter says at the end of Summary 7 that « certain railways have found it advisable to centralise the train control duties in selected stations or in dispatching offices ». He is thus considering the solution adopted by the Italian State Railways, i. e. simplified dispatching. I might mention in this connection that the dispatching system requires special costly telephone equipment; in addition, each station should have a permanent man to take orders from the dispatcher. Is it correct to recommend this system as economical for operating secondary lines?

Mr. Palmieri (in French). — When I mentioned dispatching offices, I had in mind the solution used in Italy and other countries for operating secondary lines. This solution implies, it is true, some question of cost. The controller centralises all trafic operations on a given section. It is true that the dispatching office must work throughout the day, from early morning till evening. But the resulting cost is made good by the fact that

no men are required in the intermediate stations. We have caretakers, private individuals, at hand to carry out the commercial operations, deal with the goods, and even supervise the stations. These are the men who communicate with the dispatcher. They have nothing to do with the traffic, seeing that all the operations in the stations, such as operating the points and signals, are done by the train guards. The functioning of these dispatching offices involves some expense, but thanks to the use of individuals at lower wages, the net result is a saving in cost.

Mr. de Spirlet (in French). — I am of the same opinion as Mr. Latrasse. We cannot quote train control offices as an example of an economical method. It would be enough to state : « For this purpose certain Railways have found it advisable to centralise train control duties in selected stations. » and stop there, without mentioning dispatching offices.

The President (in French). — Paragraph 7 might also cover another point of view : that of operations in the stations on secondary lines. In such stations, there is not sufficient work to occupy a full-time staff. It might be more economical to have the shunting of goods trains in these stations carried out by men travelling with the goods trains instead of by the station staff, who are too few in numbers. Summary 7 might be completed by stating :

« It can also be advantageous to leave station shunting movements to the crew accompanying the train on secondary lines if this results in a reduction of the total personnel on the line.

As for dispatching offices, this is a question of fact. The merits of the method may be disputed, but there can be no objection to reporting it, as if certain railways have adopted such a method they most likely have found it advantageous.

Mr. Matter (in French). — It depends on the service and operating conditions and on the number of trains. We read in Messrs. Grandjean and Gilmaire's report that in France, on the secondary lines there are usually only three trains a day in each direction, and sometimes only two. In such a case the installation of a dispatcher is obviously unjustified. On the other hand, in Italy there are secondary lines with a fair number of trains. Here we come up against the difficulty mentioned at the beginning, of finding a uniform definition for secondary lines the characteristics of which differ a great deal from one country to another.

I agree that we should make some mention of train control offices, but simply as a statement of fact. Each railway should go into this question very carefully. In Switzerland, we do not expect to introduce such a method.

Mr. Gilmaire (in French). — If we stated that in France on the secondary lines there were generally only three trains per day in each direction, this in itself is not a definition of the secondary lines, as there may be a much greater number of trains on them.

Mr. Willoughby, *Sudan Railways*. — In connection with Summary 7, may I point out the success obtained by using the train control system on the colonial railways.

Mr. Palmieri (in French). — In Italy the traffic on secondary lines is fairly important. We have 14, 18 or even 20 trains in each direction. Moreover,

ount must be taken of the fact that with he introduction of railcars, the number f services is still greater, and under the- e conditions traffic regulation becomes ecessary. We have in fact found it pos- ible to obtain economies through using he simplified train control system.

The President (in French). — We night adopt summary 7 with the foll- owing addition : « It can also be advan- ageous to leave station shunting move- ments to the crew accompanying the train n secondary lines, if this results in a eduction of the total personnel on the ine ».

— *Summary 7 was adopted with this ddition.*

Mr. Matter (in French). — I should ike to go back a minute to the text of ummary 6 where it says in the second aragraph : « It is desirable in certain ases that railcars should be capable of eing coupled together or of pulling one r two trailers ».

Instead of « one or two trailers », I hould like to say « one or more trail- rs » seeing that in certain cases several ehicles are hauled.

The President (in French). — Does veryone agree to this amendment?

— *Approved.*

Mr. Palmieri (in French). — *Sum- nary 8 :*

8. From the point of view of the commer- ial organisation of stations, the advisability f adopting simplified methods of making ut the charges, and of accountancy, should e stressed.

Mr. Matter (in French). — As regards his paragraph, I would like to point out hat there are cases in which it is impos- ible to replace the waybill by any other ocument. The waybill is required by law. The recommendation may be justified in internal services.

Mr. Grandjean (in French). — I do not want this paragraph to mislead Mr. Matter. We stated in our report that in the stations managed by caretakers, where simplified working is in force, summary documents are drawn up, but this does not mean that it is no longer necessary to draw up the usual documents in the centre-stations as required by the regulations; such documents are prepared for these consignments just like for any others.

Mr. Matter (in French). — In my opinion this merely makes it more complicated.

The President (in French). — Any other remarks?

— *Summary 8 was adopted.*

Mr. Palmieri (in French). — *Summary 9 :*

9. Simplified methods of operation, rates application and accountancy, make it easier, wherever possible, to commit the management of unimportant stations to private individuals. Such « caretakers », bound to the railway by a contract, usually perform all station duties except those relating to traffic safety.

Mr. Level (in French). — When discussing Summary 2, I was told that the question of handing over the operation of certain lines to local companies could not be considered, as coming within the scope of Question VII. Might I remind the Special Reporter that in the questionnaire sent out to the railways, this measure was considered. On page 1136/36 of Mr. Palmieri's report, it states in fact :

Question 3. — a) Is the working of your secondary lines assured by servi-

ces distinct from those which work the remainder of your system; *b)* Have you entrusted the working of your secondary lines to private undertakings (light railways, tramway companies, other transport undertakings, etc.)? If so, state the most interesting conditions of contracts made with these undertakings; are the latter interested in the working results?

This was the question put to the railways, so that I do not think I am going outside the subject when asking for these questions to be discussed.

Moreover, in Messrs. Grandjean and Gilmaire's report, page 1000/2, there is a very important reference to this matter. It is reported in fact that « In France certain secondary lines are worked by a Railway Company quite independently of the main line which holds the general concession », giving the conditions of this operation. This organisation has to operate the line economically under the control of the main-line system. I insist that it be admitted that my question does not lie outside the subject, which was clearly defined in point 3 of the questionnaire.

Mr. Palmieri (in French). — In reply to Mr. Level's statement, I may say that an examination of the replies received to question 3 in our report showed us that in nearly every case the operation of the secondary lines was not entrusted to individual undertakings. As a general rule, the main-line systems themselves assure the operation of these lines. At the most, all that has been done has been to hand over the operation of the stations on secondary lines, but the individuals in question do not deal with the whole of the operation of a line. It is for this reason that I answered Mr. Level I thought his objection was outside the question.

Mr. Yoyitch (in French). — I also think that as a general rule the secondary lines are operated by the main-line system itself.

Mr. Tuz (in French). — In my opinion we might admit the existence of this method. Just now, in connection with dispatching offices, the opinion was maintained, in spite of the criticisms of certain delegates, that as the experiment had been tried, it was as well to mention it in the summaries, especially as economies have been obtained thereby. In the same way, I think we might very well include Mr. Level's proposition.

Mr. Jourdain, *Chemins de fer Secondaires du Nord-Est, France* (in French). — I support what my colleague Mr. Level has just said. In doing so, I am swayed by the experience obtained in France. Furthermore, this solution is recommended in the instructions issued by the Minister concerned, to the Co-ordination Committee. I should, therefore, like to see this idea, which figured in the questionnaire, mentioned in the summaries for Question VII even though the replies received thereto were somewhat incomplete. Whether it be included in Summary 2 or Summary 9, I think it essential that some mention be made of it.

The President (in French). — I do think this question should come up again in connection with Summary 9 which merely deals with the simplified methods of operation, making out charges and accountancy, methods which make it possible to hand over the management of the less important stations to private indivi

duals. I insist upon the fact that we are now dealing with the management of stations, not of the lines as a whole.

Mr. Level raised the question of lowering the classification, which puts his remark outside the subject we are discussing. If we are to consider not lowering the classification, but entrusting the management to a third party, it might be considered that this is already included in Summary 2 which mentions the adoption of simplified methods of operation.

As for Summary 9, this refers to the management of stations, and not the management of the lines as a whole.

Mr. Jourdain (in French). — The object in view is to make the operation of the secondary lines as economical as possible. Different solutions can be considered; they have been discussed in the reports, and I do not see any objection to being more precise at the end of Paragraph 2.

The President (in French). — We have now got to Summary 9 and cannot go back to summaries which have already been examined and settled by the Meeting.

Mr. Jourdain (in French). — We can then go back to the matter at the Plenary Meeting.

The President (in French). — We will go back to it later on, if you wish.

Are there any more observations about Summary 9.

Mr. Yoyitch (in French). — I would like some more information from the Special Reporter about the sale of tickets by private individuals?

Mr. Palmieri (in French). — In Italy the management of secondary stations is confided to private individuals recruited by the State Railways after a competitive examination as to their experience and integrity. These men have to carry out the commercial operations and accountancy work; they also sell tickets and in certain cases operate the signals in order to protect the trains which have to stop in the station for any length of time. These operations which affect the safety do not depend on the initiative of the men in question, but are laid down by precise orders from the dispatcher of the station controlling the line in question.

The President (in French). — In view of these explanations, is everyone agreed about Summary 9?

— *Summary 9 was adopted.*

Mr. Palmieri (in French). — *Summary 10* :

10. Finally, it is advantageous to convert certain small stations or halts into unstaffed establishments, tickets being issued and collected by the train staff, and the goods being forwarded or delivered — when such places are open to goods traffic — as if such places were private sidings.

Mr. Matter (in French). — This paragraph stresses the interest of turning certain small stations into unstaffed halts. I would like to know how the consigning and delivering of goods are handled under these circumstances. If there is no staff at the station, various operations, such as drawing up waybills, consigning, making out charges, etc. will have to be done by the train staff. It has been said that in certain cases special documents are prepared which afterwards are replaced by a regular waybill at a given station. I would like to know the methods in use.

Mr. Grandjean (in French). — The report I drew up in collaboration with Mr. Gilmaire is based on the replies received from the railways we had to report on. Personnally I have no experience of these methods, but there is a summary of the replies we got from certain railways :

French Nord : the service is confined to complete wagon loads; supervision is by a neighbouring station.

In Belgium there are stations where there is no staff during some part of the day. The goods are off-loaded by the train staff during the stop.

In the United States of America, there are a great many stations without staff on the Pennsylvania Railroad.

The services are carried out by the train staff acting under instructions from one of the centre-stations.

The Reading Company also owns some unstaffed stations. Goods are accepted by the guard, and off-loaded by the train staff. The consignee does not know the train on which the goods will be carried. The rates are got out by a special supervisory station.

Mr. Latrasse (in French). — Private sidings are served by passing trains which pick up or leave wagons. These sidings are controlled by the neighbouring station as regards the accounts, and the completion of the wagon waybills, so that no operating difficulties arise.

Mr. Matter (in French). — What happens in the case of a private siding on the open line?

Mr. Demaret, *Belgian National Railways Company.* — On our system the stations where there is no staff are open to everyone. As a rule they are in agricultural districts where only one or two wagons are loaded per day. Demands for stock are addressed to a centre-station. The train leaves the wagon asked for and the consignor loads it up. The loaded wagon is then taken away by the next train without any document. The charges are made out at the centre-station; generally they are paid by postal cheque.

As regards the delivery of goods, the centre-station advises the consignee by post or messenger. When the consignor charges for the loading of the goods, the train staff collect the amount due. This system has not given rise to any difficulties.

In the case of parcels traffic, the matter is rather different. We have had to have recourse to a caretaker, usually a private individual living near the station. He has the keys of the warehouse and delivers the parcels.

Mr. Matter (in French). — I understand about parcels, but this has nothing to do with private sidings.

The President (in French). — Mr. Demaret's statement really comes under Summary 9.

In my opinion Summaries 9 and 10 should be left as they are, since in fact they complete each other.

Mr. Matter (in French). — I would prefer to see a slight addition made to summary 10 to make the wording clearer.

The President (in French). — We might add at the end of Summary 10 « off the open line ». This would give us the following wording : « ... as if such places were private sidings off the open line. »

— *Summary 10 was adopted with this modification.*

The President (in French). — As we have now discussed all the summaries in Mr. Palmieri's special report, we can now go back to the point raised about Summary 2. We have been asked to go back to it and mention the possibility of having main-line system's secondary lines operated by a secondary railway. Are we to add some sentence about this at the end of Summary 2? It would be possible to complete the end of this summary in the following way : « ... which can also be achieved by entrusting secondary Railway Companies with the operation under the control of the main-line systems. »

Mr. Level (in French). — I agree to this suggestion.

The President (in French). — It would be as well to state that this operation can be done with the greatest possible economy.

Mr. Matter (in French). — I think it would be abnormal for State Railways to hand over the operation of certain lines to secondary railways. In some countries such a transfer would not be allowed, neither by the authorities, nor by the staff.

Mr. Tuz (in French). — I do not think it possible to retain the wording about contracting out certain secondary lines.

Mr. Demaret (in French). — The proposed addition, in fact, amounts to saying that a railway A has more economical operating methods than another railway B, whereas we are here to discuss simplified operating methods. I do not think it necessary to mention precisely the transfer of a line from one railway to another. I think we should leave the original wording as it is.

Mr. Beghin, *Chemins de fer départementaux, France* (in French). — In view of these divergent opinions, I think the question should be well defined in order that there may be no misunderstanding. Mr. Demaret has just said that if a railway A can discover more economical operating methods than a railway B, this latter railway B can apply the methods in question.

It is not a question of having a main-line system's line operated by a secondary system in the same way as if the main-line railway would have operated this secondary line.

It is not presumptuous to pretend the secondary railways can do it better than the main-line systems. They have at their disposal a staff which does not come under the same rules and regulations as that of the main-line systems; in addition the secondary railways have more simplified signalling and operating regulations than the main-line railways.

When a secondary railway wants a main-line system to hand over to it a line with little traffic, it asks for the line in question without the staff; it asks to be allowed to use its own operating methods, which the main line system cannot introduce because it has not the same staff nor the same operating regulations. This is the point we must make clear. On behalf of all my colleagues, I request that it be simply and purely admitted that the experiment has been tried in France. Consequently from this point of view, I am in complete agreement with the wording our President has just proposed.

Mr. Palmieri (in French). — We have to deal with the question of the economical operation of a main-line system's secondary lines. I do not see how more economical operation can be obtained by leasing the line to other companies.

Mr. Renard, *French Est Railways* (in French). — I might point out that the wording of Question VII is completed by the following sub-title : « Various methods adopted to adjust the operating facilities, safety measures, and station organisation to the volume of trafic. »

In France certain main-line railways have tried to introduce simplified operating methods similar to those of secondary lines. The different secondary railways had some spare staff owing to the fact that some of their lines had to be closed down and replaced by road services. Under these conditions, it was obviously advisable to use staff with experience of the subject, without instituting special measures. It was just a question of opportunity. Properly speaking, I do not think this is a process to be adapted to the method of transport. The processes are the simplified rules, and simplified methods, and it does not affect the issue, whether they have been used by this railway or by that.

Mr. Matter (in French). — Just now it has been proposed to report the matter as a simple observation. Apart from the staff question, there are the regulations, and the spirit of economy which is at the basis of all secondary companies' management.

The President (in French). — This discussion seems to show that the French railways which could not assure the operation adequately have transferred it to another company.

Mr. Palmieri (in French). — I would like to remind you that if the handing over of lines was considered in the questionnaire, it was to obtain as much information as possible. I would, however, refer you to the actual wording of the question : the economical operation c main line system's secondary lines. It i a question of the different methods ir troduced to adapt the transport method safety measures and organisation of th stations to the importance of the traffi

Our business therefore is to decide i the summaries what these measures ar We must define the essential points fc our own economical operation of suc lines. I do not think it very useful talk about handing over these lines. Wh the secondary railway does, the main-li system can also do : adapt economic methods to its own operating. For th reason I think we should keep the sur mary as originally formulated.

The President (in French). — you like, I will put it to the vote wheth we shall keep Summary 2 just as it or not.

Mr. Level (in French). — Please m I insist on it. It cannot be said that are outside the question. As the questi was put to the railways, it was to be an wered. The Special Reporter has told that the answer was a negative one. you agree, I will read Messrs, Grandje and Gilmaire's report about this matt

The President (in French). — Eve one has read the report.

Mr. Level (in French). — It sta what has happened in France.

The President (in French). — T question has been put to the Meeting. Summary 2 to be modified or not?

— *The Meeting unanimously deci in favour of maintaining Summary 2 it stood, with only five dissenting vo*

— The Meeting was then brought t close.

DISCUSSION AT THE PLENARY MEETING

held on the 7th June 1937.

MR. HENRY-GREARD, VICE-PRESIDENT, IN THE CHAIR.
GENERAL SECRETARIES : MESSRS. P. GHILAIN, DE BOYSSON AND CAMBOURNAC.
ASSISTANT GENERAL SECRETARIES : SIR H. NIGEL GRESLEY AND DR. TH. KITTEL.

The President. — Gentlemen, we will ow examine the Summaries for Sub- ect VII.

Mr. Ghilain, *General Secretary.* — he text of the Summaries for Subject II was published in No. 4 of the *Daily ournal of the Session.*

(Mr. Ghilain read out these summa- es.)

The President. — No objections being ised, these summaries are considered as tified.

Summaries.

« 1. The organisation of the different services on secondary lines of main-line systems should have as its aim the reduction of operating expenses to a minimum.

« The fact should not be overlooked, however, that it is essential to improve the service of both passenger traffic and goods traffic of all kinds as much as possible in order to recover, at least in part, traffic lost to road competition.

« 2. The possibility of reducing the expenses must be sought in the field of technical installations, in the domain of the methods of transport, and in the adoption of simplified operating methods.

« 3. Technical installations should be « adapted to actual traffic requirements « and not require any costly upkeep.

« Simplification of signalling, and even « elimination of signals where possible, « simplification of the operation of « points and other appliances, discontinuation of guarding at certain level « crossings, are all measures frequently « adopted, which can be recommended « with a view to effecting savings.

« 4. Substitution of more economical « methods of transport for ordinary « trains is one of the essential conditions « for reducing expenses. From this « standpoint, the use of light trains or « railcars, when traffic conditions, « either passenger or goods, are not « against it, gives appreciable advantages.

« It is also advisable to restrict the « number of classes in passenger coaches « by abolishing first class and, where « possible, also second class.

« 5. Light trains should be made up « with the object of realising economical « operation and utilisation. (For example « push and pull » trains driven « from either end, and locomotives fitted « for one-man operation.)

« 6. Railcars have undergone a very « rapid development, which is worthy of « being followed up. They have made it

« possible considerably to increase the « commercial speeds, to increase the « train frequency and the number of « stops; in fact to greatly improve the « working on secondary lines.

« It is desirable in certain cases that « railcars should be capable of being « coupled together or of pulling one or « more trailers.

« 7. From the point of view of techni- « cal operation the greatest possible sim- « plification of traffic rules is recom- « mended, also the reduction of the num- « ber of stations at which operating mo- « vements take place. To this end some « systems have found it useful to con- « centrate train control duties in select- « ed stations or in dispatching offices.

« It can also be advantageous to leave « station shunting movements to the « crew accompanying the train on secon- « dary lines, if this results in a reduction « of the total personnel on the line.

« 8. From the point of view of th « commercial organisation of stations « the advisibility of adopting simplifie « methods of making out the charges « and of accountancy, should be stressed

« 9. Simplified methods of operation « rates application, and accountancy « make it easier, wherever possible, t « commit the management of unimpor « tant stations to private individuals « Such « caretakers », bound to the rai « way by a contract, usually perform a « station duties except those relating t « traffic safety.

« 10. Finally, it is advantageous t « convert certain small stations or hal « into unstaffed establishments, ticke « being issued and collected by the trai « staff, and the goods being forwarde « or delivered—when such places a « open to goods traffic—as if such pl « ces were private sidings off the ope « line. »

[656. 212.5 & 656. 225]

QUESTION VIII.

Application of rational organisation (planning) to the transport of goods,

especially in connection with :

1. **the functions and internal working of shunting yards;**
2. **the provision of inter-yard connections;**
3. **the estimation of the probable traffic to be dealt with, and the provision of the trains required;**
4. **the information to be given to the consignees;**
5. **the acceleration of the turn-round of empty stock;**
6. **the use of containers and road-rail wagons.**

Preliminary documents.

Report (Belgium and Colony, Luxemburg, Netherlands and Colonies, France and Colonies, Spain, Portugal and Colonies, Italy, Egypt), by J. COLLE. (See *Bulletin*, October 1936, p. 1027 or separate issue No. 3.)

Report (Great Britain, Dominions and Colonies, North and South America, China and Japan), by V. M. BARRINGTON-WARD. (See *Bulletin*, November 1936, p. 1113, or separate issue No. 4.)

Report (Germany, Austria, Bulgaria, Denmark, Finland, Greece, Hungary, Norway, Poland, Rumania, Sweden, Czechoslovakia, Turkey and Jugoslavia), by Dr.-Ing. A. BAUMANN. (See *Bulletin*, May 1937, p. 1191, or separate issue No. 31.)

Special Reporter : Dr.-Ing. A. BAUMANN. (See *Bulletin*, June 1937, p. 1548.)

SECTIONAL DISCUSSION.

Joint Meeting of the 3rd and 5th Sections, held on June 9th, 1937.

MR. PELLARIN IN THE CHAIR.

— The Meeting was opened at 9.30 a. m.

The President (in French). — Gentlemen to-day we have to discuss Question VIII. The Special Reporter, Dr. Baumann, will begin the proceedings.

Dr. Baumann, *Special Reporter* (in German). — Question VIII has now become extremely important for all railways. Furthermore it covers a very wide field of railway activity; for this reason it was divided up more precisely into a certain number of points which were studied separately in the reports. These were :

1. the functions and internal working of shunting yards;

2. the provision of inter-yard connections;
3. the estimation of the probable traffic to be dealt with, and the provision of the trains required;
4. the information to be given to the consignees;
5. the acceleration of the turn-round of empty stock;
6. the use of containers and road-rail wagons.

The enquiry the reporters had to make was simplified to some extent by the fact that certain aspects of the question had already been discussed at previous Sessions. At the Madrid (1930) Congress for example, the question of « methods to be used in shunting yards to regulate the speed of wagons and to ensure they travel on to the lines in the different groups of sidings », and at the Cairo Congress in 1933 that of the mechanical organisation of shunting yards, were discussed.

An examination of the replies received leads us to conclude that there is a certain uniformity in the methods used by the various railways.

Consequently there is no need to linger over the general discussions, but we can go straight on to the summaries which are based on the three reports.

The President (in French). — I agree with the Special Reporter that the question we have to consider is a particularly comprehensive one. The numerous summaries covering the various aspects of the problem prove this.

Like the Special Reporter, I think it would be advisable to discuss the summaries, chapter by chapter; in this way everyone can express his opinion, and the Meeting can decide what changes should be made. *(Agreed.)*

We will therefore begin with the summaries for Chapter I : Organisation of the services in shunting yards. Will the Special Reporter please read these summaries.

Dr. Baumann (in German). — *Summary 1 :*

1. In a general way, care should be taken that the organisation of train shunting and marshalling work meets the operating requirements; there is already great uniformity in the principles governing organisation of the work and the sequence of the operations.

Mr. Colle, *Reporter* (in French). — I think we should slightly change the second sentence and say : « uniformity in the principles... is already being sought after » instead of « there is already great uniformity... » because certain railways have not definitely said so.

Dr. Baumann (in German). — I do not see any objection to this in principle, though I must say that the proposed alteration will weaken the summary which expresses the idea that generally speaking there is already great uniformity in the principles upon which the work is organised.

The President (in French). — I think that the Special Reporter's statement is a record that in many cases there is great uniformity in the organisation of the work. I believe it is an undoubted fact that some railways may use different methods, but are considering adopting standard methods. There is absolutely no doubt about this. This finding cannot cause any inconvenience. Does Mr. Colle insist on his proposal?

Mr. Colle (in French). — In putting forward my proposal I wanted to stress the fact that systematic research is being made to standardise the operations so as to get planned working.

The President (in French). — In my opinion the text drawn up by the Special Reporter seems to sum up the situation well . If Mr. Colle does not insist, we will take summary 1 as adopted. *(Mr. Colle agreed to this.)*

— *Summary 1 was adopted unchanged.*

Dr. Baumann (in German). — *Summary 2 :*

2. The economical working of shunting yards depends first of all on the rational arrangement of the timetables. These should be drawn up so as to reduce to a minimum the time spent by wagons in the shunting yards; when the wagons are standing a very short time, better use is made of them and the number of wagons required is smaller. A proper succession of the trains, adapted to suit the capacity of the shunting yards, is also reflected in a better use of the shunting engines and locomotives.

Mr. Colle (in French). — I should have preferred some other wording, seeing that the economical working of shunting yards does not depend first of all and above all on the rational arrangement of the timetables. May I suggest the following wording : « The economical working of shunting yards is strongly influenced by the rational arrangement of the timetables. These should have as their object to reduce to the minimum the time wagons spend in the shunting yards and, by making this time very short, obtain better utilisation of the stock, so as to require a smaller number of wagons. » The final paragraph : « A proper succession of trains... » and so on to the end would then be added.

Mr. Renard, *French Est Railways* (in French). — I am wondering if it is altogether exact to state that « the economical working of shunting yards depends first of all... »

The economical working of shunting yards really means carrying out the daily business of shunting and marshalling trains with the minimum of expenditure. I think there is some contradiction between wanting to spend as little as possible and obtaining a rapid turn-round of the stock, as this does not lead to the lowest possible expenditure. The shunting hours in the yards must be regulated as economically as possible, so as to use the men, shunting gangs and locomotives as economically as possible. On the other hand, a rapid turn-round of the wagons and keeping them as short a time as possible for loading may be in opposition with the first desideratum. I think that instead of saying : « The economical working of shunting yards depends first of all on the rational arrangement of the timetables. » it would be more exact to say : « The economical working of shunting yards should be looked for simultaneously with the rational arrangement of the timetables whose object is to reduce to the minimum the time spent... » etc.

There must be a compromise between the two questions; it should not affirmed that the one necessarily leads to the other.

Dr. Baumann (in German). — As far as the German text is concerned, I do not see much difference between the original text and that proposed by Mr. Renard. In fact Mr. Renard's text states : « The economical working of shunting yards should be sought after simultaneously with the rational arrangement of the timetables in order to reduce to the minimum the time spent by wagons in the yards. »

Mr. Tuz, *Polish State Railways* (in

French). — The rational arangement of the timetables implies a reduction of the time spent by wagons in the stations. This is why it says : « The economical working of shunting yards depends first of all on the rational arrangement of the timetables. »

Mr. Renard (in French). — The wording of the summary might be altered as follows : « The economical working of the shunting yards depends first of all on the rational arrangement of the timetables. These should have as their object, on the one hand, the reduction to a minimum of the time spent by wagons in the shunting yards (when the wagons are standing a very short time, better use is made of them and the number of wagons required is smaller) and, on the other hand, the attainment of a proper succession of the trains, adapted to suit the capacity of the shunting yards, etc... »

The President (in French). — In my opinion it would be better to go back to the wording suggested by Mr. Colle and say :

« The economical working of shunting yards is strongly influenced by the rational arrangement of the timetables. »

The text suggested by Mr. Renard would then follow :

«These should have as their object, on the one hand, the reduction to a minimum of the time spent by wagons in the shunting yards (when the wagons are standing a very short time, better use is made of them and the number of wagons required is smaller) and, on the other hand, the attainment of a proper succession of the trains, adapted to suit the capacity of the shunting yards, which is also reflected in a better use of the shunting gangs and locomotives. »

Mr. Willoughby, *Sudan Railways.* — I suggest deleting the sentence : « Whe the wagons are standing a very sho time, better use is made of them and t number of wagons required is smaller

Dr. Baumann (in German). — I u derstood that this sentence had been d leted in the new wording.

Mr. Le Besnerais, *French Nord Ra ways* (in French). — The sentence question stresses the fact that one of t great advantages of a rational arrang ment of the timetables is the better ut isation of the stock obtained thereby.

The President (in French). — May ask Mr. Willoughby why he wants th sentence deleted?

Mr. Willoughby. — As it happens, t fact is self evident, and I do not thi it desirable to include in the summar a statement giving no new information

The President (in French). — can be said of many things that they self evident, but it is just as well to peat them nevertheless. Moreover, it not certain that the object of a timeta should be to reduce to the minimum time spent by wagons in a shunting ya It may be concluded therefrom that the wagons will spend less time in yards, they will be loaded for a shor period, and consequently make a grea number of journeys. It is not a l thing to stress this point, and in my o nion there is no objection to doing it.

Mr. Barrington-Ward, *Reporter.* — my opinion, this sentence does not pear to be out of place in the summa Although it states a well known f there is no harm in repeating it o more.

The President (in French). — Does Mr. Willoughby insist on his suggestion?

Mr. Willoughby. — No.

The President (in French). — I will read once more the text of summary 2 as evolved during these discussions :

« 2. The economical working of shunting yards is strongly influenced by the rational arrangement of timetables. These should have as their object, on the one hand, the reduction to a minimum of the time spent by wagons in the shunting yards (when the wagons are standing a very short time, better use is made of them and the number of wagons required is smaller) and, on the other hand, the attainment of a proper succession of the trains, adapted to suit the capacity of the shunting yards, which is also reflected in a better use of the shunting gangs and locomotives. »

— *Adopted.*

Dr. Baumann (in German). — *Summary 3 :*

3. As exact a plan as possible of the work to be done in the shunting yards and the way it is to be carried out should be drawn up, both as regards time and work. The staff and locomotives should be allocated in such a way as to ensure their economical use; a sufficient margin must be allowed for frequent abnormal demands, whereas for cases of special demands which rarely arise, the plan must be departed from. The plan should provide for suitable connections between arriving and departing trains.

I might add that the reports show that all the railways recognise the necessity for drawing up plans of the work in shunting yards. In the case of large shunting yards, such plans are drawn up and worked to in all cases. In shunting yards of lesser importance they are not quite so general. Nonetheless I considered that the summary should be made to read : « As exact a plan... should be drawn up » as this wording can apply to both large and smaller shunting yards.

Mr. Goursat, *French Nord Railway* (in French). — May I make a remark about the French text? In the French text it says : « ... on ménagera une marge pour les fréquentes demandes anormales, tandis que pour les demandes spéciales qui se produisent rarement, il faut prévoir, etc... ». I think that the Special Reporter meant by this the reception and shunting of the trains. It seems to me that this idea would be expressed more clearly if the following text were substituted : « ... On ménagera une marge pour les besoins supérieurs à la normale, qui se reproduisent fréquemment, tandis que pour les besoins spéciaux qui se produisent rarement, il faut prévoir... etc. »

Dr. Baumann (in German). — I agree that abnormal demands which occur regularly should be included in the plan, while special measures are required to meet those which only occur at rarer intervals.

The President (in French). — The French text should consequently be slightly altered.

Mr. Goursat (in French). — We could replace « pour les fréquentes demandes anormales » by « pour les besoins supérieurs à la normale ».

Mr. Renard (in French). — I wonder whether the expression « pour les besoins supérieurs à la normale » would not bring about some contradiction. Would it not be better to say « pour les

fluctuations »? I do not insist on this, however.

Dr. Baumann (in German). — The German text will remain unaltered.

The President (in French). — Yes, only the French wording will be changed.

Mr. Renard (in French). — The text would then read : « on ménagera une marge pour les besoins supérieurs à la normale, qui se reproduisent fréquemment, tandis que, pour les besoins spéciaux qui se reproduisent rarement, il faut prévoir des dérogations au plan?

The President (in French). — Or we might say « ... pour les besoins supérieurs aux services prévus. »

Mr. Le Besnerais (in French). — Let us say : « ... pour les besoins supérieurs à la moyenne. »

The President (in French). — I agree. The final wording would therefore be as follows :

« On ménagera une marge pour les besoins supérieurs à la moyenne, qui se reproduisent fréquemment, tandis que, pour les besoins spéciaux qui se produisent rarement, il faut prévoir des dérogations au plan ».

Mr. Renard (in French). — At the beginning of the French text of the Summary it says : « Il est utile d'établir un plan aussi exact que possible des mouvements à effectuer dans les gares de triage, etc. » This word « mouvements » might be understood as referring to locomotive movements. As the plan should also cover the work done by the shunting gangs, I would have preferred to replace the word « mouvements » in the French text by the word « operations », which gives a better idea of the work done i the shunting yards by both locomotive and shunting gangs.

The President (in French). — I quit agree. The complete text of Summary thus becomes :

« 3. Il est utile d'établir un plan auss exact que possible des opérations à effec tuer dans les gares de triage et de leu réalisation au double point de vue d temps et du travail. Le personnel et le locomotives sont à répartir en tenan compte de leur utilisation économique on ménagera une marge pour les besoin supérieurs à la moyenne, qui se produi sent fréquemment, tandis que, pour le besoins spéciaux qui se produisent rare ment, il faut prévoir des dérogations a plan. Le plan doit assurer les correspor dances à réaliser entre les trains arri vants et partants ».

— *Adopted* (the English text remaine unaltered).

Dr. Baumann (in German). — *Sum mary 4 :*

4. The establishment of a working pla pre-supposes a knowledge of the time re quired for the different operations and th amount of labour needed to carry them ou the diversity of the trains and the variab density of the traffic affect the working tim and the labour required so much that th unit values calculated from the averag number of trains are not always, and in fa are rarely, sufficient for planning the wor It is not possible to get the whole of th shunting operations to strictly follow a re gular rhythm owing to the connections esta blished by the timetables between the goo trains and those of the passenger trair Consequently a satisfactory planning of th shunting operations must depend to a larg extent on the particular circumstances of th moment.

I might add that during a discussion I had with the other Reporters, we came to the conclusion that certain alterations ought to be made to the above wording. It seemed to us that the text was too general in meaning. Though in the case of a certain number of operations it is possible to speak of « a regular rhythm » of the shunting operations, it seemed that in the case of some of the operations, for example the shunting and remarshalling of trains, the same recommendations cannot be made, because it is impossible to obtain the necessary conditions.

For these reasons, I agreed with my colleagues that the following text should be put before you :

« 4. The establishment of a working plan pre-supposes a knowledge of the average time required for the different operations, and the amount of labour needed to carry them out.

« The carrying out of an existing plan does not usually lead to any difficulty in splitting up the trains, as long as the traffic is sufficiently dense.

« When making up trains, on the contrary, the diversity of the trains and the variable density of the traffic affect the working time so much that the unit values calculated from the average number of trains are only rarely sufficient for planning the work.

« Thus a regular and uniform rhythm of marshalling operations has only been realised in exceptional cases. »

To this new wording I should like, however, to add the last sentence of the original text :

« Consequently a satisfactory planning of the shunting operations must depend to a large extent on the particular circumstances of the moment. »

Mr. Goursat (in French). — In my opinion the main advantage rests in the possibility of speeding up as much as possible the marshalling operations, because I think so far these have not been studied as systematically as the shunting operations. When the Special Reporter says that the uniformity of the methods used proves their utility, this is true as far as the shunting is concerned, but to a smaller extent in the case of the remarshalling operations.

He talks about a shunting programme which implies a great number of men performing all kinds of operations. This programme seems to cover only the shunting operations. Now we have already studied the use of a programme defining the work to be done when marshalling trains. It is possible to determine theoretically how the train can be marshalled with a minimum number of operations. This then serves as the basis for the orders. In my opinion it throws a doubt on the possibility of applying rational methods to the marshalling when we say that « the diversity of the trains and the variable density of the traffic affect the working time and the labour required so much that the unit values are rarely sufficient for planning the work ». There is still much to be done in the way of studying the organisation of the marshalling work, and it is to be hoped that some day this will be undertaken systematically.

Further on in the same summary, it says : « Thus a regular and uniform rhythm of marshalling operations has only been realised in exceptional cases ». I would like the fact to be stressed that this has not yet been done owing to the fact that the question has not been sufficiently studied. Instead of saying : « has only been realised in exceptional

cases », I would prefer : « has, up to the present, only been realised in exceptional cases ».

Mr. Renard (in French). — I would like to associate myself with the remark made by my colleague. I think a further point might usefully be made clear. If, generally speaking, it is difficult to draw up working plans for goods trains from one shunting yard to another, so that up to the present this has rarely been done over a whole railway system, there are cases on the contrary where such planning can be done fairly easily. Each of our marshalling yards generally forms a centre from which a number of main or secondary lines radiate. Trains leave each of these yards to distribute wagons in the small adjoining stations up to a certain distance. To make up such trains means arduous and expensive work. The number of wagons for each station is known in advance. For the last twenty years, on the French Est Railway we hav employed a rather special system fo making up these trains whenever th timetable makes it possible. Accordin to this system we begin, not by separat ing the cuts or wagons train by train but by shunting into the same siding a the cuts which are to be at the head o trains leaving at about the same time and on another siding the cuts whic will form the second part of such o such of these same trains. The marshall ing consists in splitting up these trains separating the cuts train by train. Afte this marshalling operation, the trains ar all classified, and the cuts joined up This is an applicable example of planr ing.

The President (in French). — Gen lemen I have to attend the Meeting of th Permanent Commission, so I hope yo will excuse me. Mr. MATTER will act a President in my place.

PRESIDENCY OF MR. MATTER.

The President (in French). — I would like to hear Dr. Baumann's opinion of Mr. Goursat's remarks.

Dr. Baumann (in German). — I see no objection to taking Mr. Goursat's remark into account in the new text. As regards shunting operations, I think it is always possible to work to a regular rhythm, and it does not matter very much whether the trains arrive regularly or not.

But the marshalling of the trains is a different matter. Though it is always possible to work to a plan, it is not always certain that a regular rhythm can be maintained. It is not always possible to count on the staff or on the arrival of the units. For this reason I want to discriminate between the two aspec of the question, marshalling and shun ing, but less categorically as regards th marshalling work.

Mr. Goursat (in French). — I wou like to hear the proposed French an German texts.

— Dr. Bauman read the German tex The English text evolved from the di cussion was as follows :

« 4. The establishment of a workin plan presupposes a knowledge of th average time required for the differe operations and the amount of labo needed to carry them out.

« The carrying out of an existing pla

oes not usually lead to any difficulty in plitting up the trains, as long as the raffic is sufficiently dense.

« When making up trains, on the contrary, the diversity of the trains and the ariable density of the traffic affect the vorking time so much that the unit values calculated from the average number f trains are, *as yet*, only rarely sufficient for planning the work.

« Thus a regular and uniform rhythm f marshalling operations has, *up to the resent*, only been realised in exceptional ases.

« Consequently a satisfactory planning f the shunting operations must depend o a large extent on the particular circumstances of the moment.

The President (in French). — If here are no objections, we will go on to oint 5.

— *Adopted.*

Dr. Baumann (in German). — *Summary 5 :*

5. Mechanical equipment, rail brakes, and utomatic point operation have given excellent results in large shunting yards; the perations are speeded up and the efficiency f the yards increased. On large Railways ith heavy traffic, the train marshalling may us be concentrated, the smaller yards especially at junctions only dealing with wans for or from stations in their immediate eighbourhood.

Mr. Boistel d'Welles, *Paris-Orléans ailways* (in French). — Point 5 really onsists of two parts, the one of which oes not follow from the other, as the xt seems to imply. It is true that echanical equipment, rail brakes and utomatic point operation, are satisfactory. But it does not follow that the use f such equipment on large railways ith heavy traffic makes it possible to concentrate train marshalling operations. I propose therefore to divide up this summary, ending the first part with the word « increased ». There will then follow a second paragraph reading : « The improvement of the shunting methods makes it possible, on systems dealing with heavy traffic, to concentrate the trains marshalling work, in smaller yards, especially junctions, only having to... ».

Dr. Baumann (in German). — I see no objection to dividing up the summary into two paragraphs. The French text of Summary 5, however, seems to be a very good translation of the German.

Mr. Colle (in French). — I think the second part is too detailed about the work to be done in junctions. The fact is, in principle, that it is the shunting yard which makes up the groups of wagons to be left at the junction. It is desirable to make up the groups of wagons at the marshalling yard. The work in the junction is limited to transferring the cuts from one train to another. It would be better not to go into details about the work at the junction, and I think we might say : « On large Railways with heavy traffic, it is possible to concentrate in large marshaling yards the work of making up trains, reducing as much as possible the work at small yards, and especially at junction stations. »

Dr. Baumann (in German). — Agreed.

Mr. Boistel d'Welles (in French). — If I understand Mr. Colle's remark aright, he means to say that the main shunting yard should send the cuts to the junction, already prepared. The Special Reporter's text seems to imply that the junction has to carry out shunting operations to marshall the trains proper-

ly. This is the method we use on the Paris-Orléans. We try to improve the working of the secondary shunting yards, wherever economies can be made.

I would like both points of view to be taken into account, and the text to read : « ... the small stations, especially junctions, only having to shunt off cuts of wagons » *without* mentioning how these cuts are otherwise dealt with. There are in fact two different ideas : either the cuts leave the yard already marshalled, or they must still be marshalled.

Dr. Baumann (in German). — I would like to point out that an examination of the different reports shows that different methods are used on various railways. On some railways all the work is done in the large shunting yards, whereas on others certain operations are carried out by the junctions and some less important yards. However, I see no objection to taking Mr. Colle's suggestion into account, since it mentions this diversity of methods.

The President (in French). — Does everyone agree?

Mr. Renard (in French). — I have yet another remark to make : At the beginning of the summary it says : « Mechanical equipment, rail brakes and automatic point operation have given... etc. » Does not this formula exclude distant-controlled slipper brakes? Rail brakes as a general rule are taken as meaning brakes gripping the tyres; there are, however, other kinds. In my opinion it would be better to say : « remotely-controlled brakes ». The text would then read : « Mechanical equipment, remotely-controlled brakes and automatic point operation... etc. ».

Mr. Baumann. — Agreed.

The President (in French). — T text of summary 5 as reworded to take the remarks made into account will th refore read :

« 5. Mechanical equipment, remotel controlled brakes, and automatic poi operation have given excellent results large shunting yards; the operations a speeded up and the efficiency of t yards, increased.

« On large Railways with heavy tra fic, it is thus possible to concentrate large marshalling yards the work making up trains, reducing as much possible the work at small yards, a especially at junction stations. »

— *Adopted.*

Mr. Goursat (in French). — Wh discussing summary 4 we decided t up to the present the diversity of t problems prevented investigations i the organisation of the marshalling op ations being carried very far. It is impression that a summary might made about this, and I would like to this matter investigated more closely. system we call « pre-marshalling », c sisting in shunting the cuts which to make up the marshalled trains distributing them among the sidings such a way that with only a few op ations they can be successively collec to form the complete trains, has led to prepare a recommendation whic should like to lay before the Meeting

« 6. The study of the organisation marshalling yards has generally been developed than that of splitting-up ya Since the work of making up train that which involves the greatest expe in machines and locomotives, it is de able that Administrations should st the most economical methods of mal

up trains, taking into account the preparatory work which can be done at the time of splitting up, thanks to a judicious allotment of tracks. »

Dr. Baumann (in German). — I agree about this additional summary. However I should like to point out that it deals with a side of the question I did not go into as it had already been examined at the Madrid and Cairo Congresses.

— *The text proposed by Mr. Goursat was adopted and become summary 6.*

(Mr. Pellarin *returned to act as President.)*

Mr. PELLARIN in the Chair.

The President (in French). — We have come to Chapter II : *Inter-yard connections by trains.*

Dr. Baumann (in German). — *Summary 1 :*

1. If fast working is to be obtained, an essential condition is that marshalling yards be interconnected by trains which are not required to serve intermediate stations.

— *Adopted without discussion.*

Dr. Baumann (in German). — *Summary 2 :*

2. If the traffic arrives in sufficient quantities, it is recommendable to work it through to distant receiving stations, avoiding an intermediate shunting yard, provided the time taken to collect the wagons in the shunting yard before departure is shorter than the time to be saved on shunting and marshalling in the intermediate shunting yard.

Mr. Renard (in French). — I would like to make a slight change in this text. Instead of « avoiding an intermediate yard » I think it would be better to say : « avoiding one or more intermediate shunting yards »; and in the same way, at the end instead of « marshalling in the intermediate shunting yard ». I would prefer to say : « marshalling in intermediate shunting yards ».

Dr. Baumann (in German). — Agreed.

The President (in French). — Does everyone agree about adopting summary 2 with the alterations suggested by Mr. Renard?

— *Adopted.*

Dr. Baumann (in German). — *Summary 3 :*

3. If the quantities of wagons to be forwarded are small, so that the time required to collect a sufficient number for direct despatch to the most distant receiving station is too long, by making up lots of wagons which arrive at the shunting yard and marshalling them as they are into a train made up therein, all the work to be done can be completed as quickly or even more quickly if the time to collect them is appreciably shorter.

— *Adopted without discussion.*

Dr. Baumann (in German). — *Summary 4 :*

4. There should be enough regular trains to work the traffic experience shows may be expected, and to obtain, by good transfer possibilities, satisfactory through train workings in the case of long-distance goods traffic.

— *Adopted without discussion.*

Dr. Baumann (in German). — *Summary 5 :*

5. The optional trains required should be made known as quickly as possible in order to avoid delays in the conveyance of goods,

avoid interfering with the working of the stations by blocking them up, and to make good use of the locomotives and staff required to work the optional trains. The timetables for the optional trains should be prepared at the same time as those of the regular trains and be inserted in the working timetables.

Mr. Colle (in French). — Could we not begin the French text by : « La mise en marche de trains facultatifs... ».

Mr. Renard (in French). — I am wondering if the expression « mise en marche » is not likely to be misinterpreted. If we say « mise en marche des trains facultatifs » this might be taken to mean trains which have already been marshalled. Obviously this is not what Mr. Colle means. It would not be possible to learn anything about the utilisation of the locomotives from this. I think we should say : « La prévision des trains facultatifs devrait être faite le plus tôt possible afin d'éviter... ».

Dr. Baumann (in German). — The German text agrees with Mr. Renard's observation and does not require any alteration.

The President (in French). — Does everyone agree about making this alteration at the beginning of the French text?

— *Agreed.* (The English text remained unchanged.)

Dr. Baumann (in German). — *Summary 6 :*

6. The organisation of the special trains should not be left to the stations, but be dealt with by a central office (traffic control, dispatcher) having wider jurisdiction.

Mr. Matter (in French). — I would like to point out that on page 67 of the separate issue of the Special Reports it says that this system is not used every where. I suggest we say therefore « ... It is recommended that the organisation of the special trains on large systems with dense traffic... »

Mr. Renard (in French). — Or better still : « ... that the organisation of the running of the special trains... »

The President (in French). — This last change does not apply to the German text.

The final text might be worded as follows :

« 6. It is recommended that the organisation of the running of special trains on large Systems with dense traffic should not be left to the stations, but should be entrusted to a district office (traffic control, dispatcher) having wider jurisdiction. »

— *Summary 6 was adopted with these alterations.*

The President (in French). — We now come to Chapter III of the summaries : *Estimation of the traffic and of the trains required.*

Dr. Baumann (in German). — *Summary 1 :*

1. As regards the probable general trend of the traffic and the important individual loads, it is only possible to form an opinion some time beforehand by keeping in close contact with the consignors, by taking into account previous experience, by railway and economic statistics and — a relatively short time ahead — by the demands for empty stock; there is no standard method of solving these problems.

I might add that very various methods are used for this purpose on different railways, as is shown by the replies received by the Reporters, so that it is very difficult to recommend a single solution

The President (in French). — I sug-
est we alter the beginning of this para-
raph as follows : « En ce qui concerne
évolution probable du trafic et les im-
ortants transports individuels à pré-
oir... »

— *Adopted with this alteration to the rench text.* (The English wording re-
ained unaltered.)

Dr. Baumann (in German). — *Sum-
ary 2 :*

2. In the case of consignments already
nded in for despatch, there are prelimin-
y advice methods, either between despach-
g and receiving stations and marshalling
rds, or through the medium of central of-
es which notify the information received
om the departure stations to the other sta-
ns concerned and, in some cases, to neigh-
uring Railways.

Mr. Colle (in French). — In some ca-
s the consignee is advised the day the
agon leaves. The question then is to
now whether the railway has published
metables for the benefit of its custo-
ers. I suggest another text stating :
As the train services are now organis-
, it is not possible to give exact in-
rmation about the hour a wagon sent
f on a given date will arrive; in the
se of certain traffic, and under certain
nditions, the large Systems have taken
ps to guarantee consignments follow-
g a definite route and arriving at des-
ination according to a definite timetable.
such cases the list of recommended
utes can be consulted by customers. »

Mr. Renard (in French). — There is
rhaps some contradiction if we say :
.. it is not possible... ».

The President (in French). — I have
nething to say about the word « gua-
rantee ». **Mr. Colle** said : « In the case of certain traffic and under certain conditions, the large systems have taken steps to guarantee consignments following a given route and arriving... ». In fact the consignment is not guaranteed, but its routing booked and in general adhered to. If however this booked route is not followed, the railway does not have to pay any compensation. « Guaranteed » seems to me too categorical; we might say « regulated ».

Mr. Colle (in French). — Agreed.

Mr. Renard (in French). — I wish to associate myself with Mr. Colle's suggestion, but I had not intended to suggest any change in summary 2 of Chapter III. However in Chapter IV : *Advice to be given to the consignees* », I think it would be as well to add a recommendation which might form a fourth summary. In principle we might say : Up to the present the Railways cannot determine and advise their customers, when a wagon is dispatched, at what hour it will arrive, except in a few cases. It is recommended to the railways, to meet road motor competition which has solved this problem and advises the consignor what day and at what hour the lorry will arrive, to investigate the possibility of advising their clients of the date and time of arrival without guaranteeing it however, not only in the case of registered consignments, but in as many cases as possible.

I have drawn up a text, and if you agree I will read it out : « Most railways have not yet solved the general problem of being able to advise the consignor when a wagon is loaded for any consignee (so as not to exclude certain kinds of traffic) of the date and exact hour of arrival at destination. In view of the

fact that this problem has been solved by road transport firms, it is desirable that it should be carefully investigated by the railways. »

The President (in French). — I think it would be better not to replace summary 2 of Chapter III by Mr. Colle's text, but we have not yet heard the Special Reporter's opinion.

Mr. Renard (in French). — I see no objection to it. In my opinion, the problem should be solved as generally as possible, not only in the case of registered consignments, which after all are only a tiny part of the traffic, but for all kinds of goods.

The President (in French). — I doubt the wisdom of such an absolute statement, for as soon as conveyance in predetermined trains is made general, the goods traffic becomes as rigid as the passenger traffic, and this may become very costly practice, as it makes it impossible to cancel trains if need be. It should be stated that as motor competition has been able to announce when parcels will arrive, it is desirable that the railways should investigate and do the same whenever possible.

Dr. Baumann (in German). — I would agree to incorporating Mr. Renard's proposal in the form of an additional paragraph in Chapter IV. But I want to insist that point 2 be maintained as formulated. The examination of the replies received made it clear that all railways in every case advice the consignee of the arrival of goods, whether or not he has already been advised directly by the consignor.

The President (in French). — How is the additional paragraph in Chapt IV to be worded?

Dr. Baumann (in German). — V might say : « Because of the competiti of the road motor car, it seems importa for Railway Administrations to exami the possibility of taking steps for advi ing, as far as possible, the consignor the date and hour of arrival of t goods », and this text could be added the end of summary 2 in Chapter IV.

Mr. Renard (in French). — I like th wording.

Mr. Goursat (in French). — I wou like to point out that no mention is ma of the advice to be given to the consi nee.

The President (in French). — I su gest the following text for the additi to summary 2 in Chapter IV : « Becau of the active competition of the road m tor car, it seems important for Railw Administrations to examine the possi lity of advising the consignor as soon possible of the probable date of arriv of the goods. »

Mr. Goursat (in French). — The a to be achieved is the possibility of i forming the consignor that the wagon has just loaded will arrive at such place on such a day and at such an ho

The President (in French). — T result of these discussions therefore that summary 2 in Chapter III is to main as it is.

— *Agreed.*

The President (in French). — W then come to Chapter IV which is titled : *Advice to be given to the cons nees and consignors.*

Summary 1 :

1. Nearly everywhere the consignee is ad-sed of the arrival of his goods and of the ct that they are ready for off-loading, so at the wagons, sidings, and loading plat-rms can be made available again as quickly possible.

As no objections are raised in connec-on with this point, it can be taken as reed. *(Approved.)*

We then come to *Point 2 :*

2. No account is taken of the fact that the nsignee, according to general practice, is formed by the consignor of the day and ur of departure, and consequently can cal-late the probable day and hour of arrival, m his own experience or with the help of goods train timetable or similar docu-nts.

It has been decided to add a new para-aph. The beginning also might be ghtly altered so that the complete text uld read :

« 2. In advising the consignee, no ac-unt is taken of the fact that, according general practice, he is informed by the nsignor of the day and hour of de-rture and consequently can calculate e probable day and hour of arrival, m his own experience or with the lp of a goods train timetable or simi-documents.

« Because of the active competition of e road motor car, it seems important Railway Administrations to examine e possibility of advising the consignor soon as possible of the probable date arrival of the goods.

— *Adopted.*

Summary 3 :

. When the demands for wagons are vy, the advice notice — together with the mation that the period within which the ds are to be unloaded is shortened, if need be — is particularly important; the preliminary advice, by the last station of call to the receiving station, of the probable time of arrival of goods of some importance is to be recommended.

— *Adopted.*

And so we come to Chapter V : *Acceleration of the turn-round of empty stock.*

Dr. Baumann (in German). — *Summary of Chapter V :*

The turn-round of empty stock is accelerated by the following methods, the application of which depends on the particular conditions of the railway concerned and the kind of traffic worked :

(a) Concentration of the empty wagons at large collecting centres from which they can be distributed to the consuming points;

(b) Working empty stock towards the regions generally short of wagons, without special demands having to be made;

(c) Working the wagons in special empty-stock trains, which do not shunt in the marshalling yards and avoid all unnecessary stops. These very light trains are formed with the maximum number of axles and their timings adapted to the small weight hauled;

(d) Authority to reduce the load of empty-stock trains and loaded-wagon trains below the nominal value when there are heavy demands for rolling stock, and so reduce the turn-round times in a general way; at the same time, loading points served more frequently, and users given a preliminary advice of the time the loaded or empty wagons will be at their disposal.

Mr. Matter (in French). — I would like to point out that paragraphs *(a)*, *(b)* and *(c)* of this summary relate to the measures to be applied in ordinary times, whereas paragraph *(d)* gives the measures that should be applied when there is shortage of stock. In this latter

case there are other measures which can be successfully used, and I think it would be as well to mention them. I think therefore that paragraph *(d)* should be worded as follows :

« *(d)* At times of great demand for rolling stock, authority to reduce the load of trains below the nominal value, increased service of loading points, extension of working hours at stations, and the preliminary notification to customers of the time that loaded or empty wagons will be at their disposal. »

To sum up, all these measures tend to speed up the turn round and obtain better utilisation of the stock.

The President (in French). — Any remarks?

Mr. Goursat (in French). — The problem in question is concerned with empty stock. I doubt if it can be extended to include loaded wagons, seeing that the Chapter is entitled : Acceleration of the turn round of *empty* stock.

Mr. Renard (in French). — Under these conditions the summary should not be altered.

Mr. Matter (in French). — I would like to point out that the original text of paragraph *(d)* also mentions loaded wagons.

Mr. Goursat (in French). — I think it would be sufficient if we left out the word «loaded ». The loading points are served in fact by bringing up empty stock.

The President (in French). — The problem is to multiply the number of trains between the different points. This result is obtained by allowing the weight of the trains to be reduced. Increasing the hours stations are open can also be considered. The question we are inte rested in is the time taken to load an off-load wagons.

Mr. Matter (in French). — Just so.

The President (in French). — Conse quently the text sugested by Mr. Matte could be adopted if the word « loaded is left out.

Do you agree?

— *The following text was adopted :*

« *(d)* At times of great demand fo rolling stock, in order to reduce the turn round time of the wagons, authority t reduce the load of trains below the no minal value, increased service of loadin points, extension of working hours a stations and the preliminary notificatio to customers of the time that empty wa gons will be at their disposal », *the othe paragraphs being retained unaltered.*

The President (in French). — W now come to Chapter VI : *Use of co tainers and road-rail wagons.*

Dr. Baumann (in German). — *Sum mary 1 :*

1. Very few Railways have left the expe rimental stage as regards the use of contain ers. It appears that the questions of the rat and conveyance between the railway and th consignor's or consignee's premises can b solved satisfactorily.

I might add that when discussing th matter with the other Reporters, w agreed to change the beginning of th paragraph so as to take into account th fact that the use of containers is limit to large Railways working their own d livery services. Consequently instead of « Very few Railways have left... » t wording would be : « Only some Ra ways, especially those with their own co lection and delivery services, have left..

Mr. Goursat (in French). — The German text seems to imply that the stock used in the delivery services must belong to the railway.

Dr. Baumann (in German). — The German text corresponds to the French text.

The President (in French). — If everyone agrees, the text of summary 1 will read :

« 1. Only some Railways, especially those with their own collection and delivery services, have left the experimental stage as regards the use of containers. It appears that the questions of the rates and conveyance between the railways and and the consignor's or consignee's premises can be solved satisfactorily. »

— *Adopted.*

Dr. Baumann (in German). — *Summary 2 :*

2. In many cases the use of the large container is still hampered by the difficulty of transferring it from the wagon to the lorry and inversely, owing to the lack of suitable cranes, and the fact that other simple means of transfer between the two means of transport have not yet been perfected. Small containers used for parcels and special small consignments appear to be advantageous, especially from the point of view of the reduction of transhipment operations.

In view of the favourable results obtained in Great Britain and America, in the matter of container handling by means of mobile cranes moving on the road, we deemed it advisable to alter the proposed text as follows :

« 2. It is specially important in the case of large container traffic, to suitably arrange the transfer from road to rail vehicles and inversely. Especially useful for this purpose are mobile cranes, which run on the road alongside the railway wagons and economise on all shunting operations. Difficulties in the use of large containers can mostly be traced to the lack of such mobile cranes or other mechanical unloading equipment. Small containers used for parcels and special small consignments appear to be advantageous, especially from the point of view of the reduction of transhipment operations.

Mr. Renard (in French). — It would be advisable to make a small addition to stress the difficulty of handling containers at the consignors' and consignees' premises, stating that this difficulty is a further obstacle to the general use of containers.

Dr. Baumann (in German). — As far as I know, there have been no complaints about the difficulty of handling containers when they are being delivered.

Mr. Renard (in French). — When actually being delivered at the consignee's door.

Dr. Baumann (in German). — I have never heard of it, and I should like some information about this subject.

Mr. Goursat (in French). — The development of the use of containers is hampered by subsidiary problems. The difficulty of handling containers is the obstacle in the way of their development. I think we should take this into account in the text, and instead of saying « Difficulties in the use of large containers can... », say : « Difficulties in developing... etc. »

Dr. Baumann (in German). — I see no objection to this. The text could be

altered to : « Difficulties met with by the Railways *in developing...* ».

Mr. Goursat (in French). — I would prefer : « Difficulties met with by the Railways in developing the use of large containers can mostly be traced to the lack of such mobile cranes or other mechanical unloading equipment, at the stations and on the premises of consignors and consignees ».

Mr. Barrington-Ward. — The difficulty can be overcome by the use of a trailer which can be operated by a lorry. In this way the load may be left at the consignee's door.

The President (in French). — This is one way, but the lorry has to be lifted.

Mr. Jourdain, *Chemins de fer secondaires du Nord-Est, France* (in French). — I might also mention a method used in France for some time, which has attracted the attention of the Central Coordination Committee. We have foreseen the increasing use of lorries or trailers which are loaded at the consignor's premises and transferred by wagon to the station nearest the consignee. An organisation is being formed, and a standard lorry has been designed for this purpose. It would appear that an addition might be made to summary 2, or a special paragraph added to the effect that :

« One can also consider, in order to ensure « door to door » transport, the use of lorries or trailers loaded unto railway wagons at the nearest station to the sending establishment and unloaded similarly at the nearest station to the receiving establishment. » This would meet the recommendation made.

The President (in French). — In my opinion, a better place for Mr. Jourdain's observation would be paragraph 4 wherein road transport is being deal with, and the final text for summary 2 about large containers would read :

« 2. It is specially important in the case of large container traffic, to suitably arrange the transfer from road to rail vehicles and inversely. Especiall useful for this purpose are mobile cranes, which run on the road alongsid the railway wagons and economise on al shunting operations. Difficulties met wit by the Railways in developing the us of large containers can mostly be trace to the lack of such mobile cranes or othe mechanical unloading equipment, at sta tions and on the premises of consignor and consignees. »

— *Adopted.*

On the other hand, in agreement wit the Special Reporter, the end of the or ginal text of summary 2 about small co tainers would become summary 3, follows :

« 3. Small containers used for parce and special small consignments appe to be advantageous, especially from th point of view of the reduction of tran shipment operations. »

Mr. Renard (in French). — We mig add : « and to facilitate handling. »

— *This new summary 3 was adopt with the addition suggested by Mr. R nard.*

The President (in French). — W thus come to summary 3 of the origin text which now becomes summary 4.

3. Undoubtedly, the use of containers f door to door transport has an extremely f vourable influence on the ability of the ra way to meet competition.

— *Adopted without discussion.*

Dr. Baumann (in German). — *Summary 5 (former No. 4) :*

4. Road transport of railway wagons is on- at present in use on a very few Railways. though it has been used on a fairly large ale with good results, no definite judgment n be formulated on the subject as yet.

Mr. Giovene, *Italian State Railways* (in rench). —This summary in its present rm is based on the information given 1 pages 72/73 of the special report. here are in fact two methods. With the il-road wagon the wheels and axles ve been so designed that a railway wa- n can run on the road. A second me- od is to load the wagon on a road vehi- e. As far back as in May 1934, the Ita- an State Railways carried out tests with road vehicle which could carry a wa- n. On account of the good results tained, a certain number of tractors re ordered. These road vehicles are ed by the public and the stock has en increased to 19, with 10 tractors. eir use is being extended; the number s had to be increased. In a short time will have 35 road vehicles and 15 trac- rs. If the results obtained by the use these vehicles on our system and with nilar vehicles on the Reichsbahn are ken into account, I think the wording the summary might be made a little re optimistic. In my opinion we could y : « The Railways which adopted road hicles allowing of railway wagons ing carried, find this system quite sa- factory. However, the time has not yet me for formulating a definite judg- nt. »

The President (in French). — Any marks?

Dr. Baumann (in German). — The mmary might be altered to take Mr. ovene's proposal into account.

Mr. Giovene (in French). — I insist on the fact that the first method consisting of suitable alterations to the wheels of railway wagons to allow them to run on the road, has not proved satisfactory up to the present.

The President (in French). — I propose to change the wording of summary 5 as follows :

« 5. Road transport of railway wagons is only at present in use on a few Railways. The use, by some Railways, of special road vehicles for carrying railway wagons has given satisfactory results. Nevertheless, the time has not yet come for formulating a definite judgment. »

Mr. Giovene (in French). — Just so.

The President (in French). — We might add, to take Mr. Jourdain's recommendation into account, the following words :

« One can also consider, in order to ensure « door to door » transport, the use of lorries or trailers loaded unto railway wagons at the nearest station to the sending establishment and unloaded similarly at the nearest station to the receiving establishment. »

Has no one anything to say?

— *Adopted.*

The President (in French). — Gentlemen, this brings us to the end of this important question.

Before bringing the Meeting to an end, I want to compliment Dr. BAUMANN, the *Special Reporter,* on his remarkable work; his summaries were formulated in such precise terms that very little discussion of them was necessary. *(Applause.)*

— The Meeting ended at 1 o'clock.

DISCUSSION AT THE PLENARY MEETING

Meeting held on 11th June, 1937.

Mr. LE BESNERAIS, Vice President, in the Chair.

General Secretaries : Messrs. P. GHILAIN, de BOYSSON and CAMBOURNAC

Assistant General Secretaries : Sir H. Nigel GRESLEY and Dr. Th. KITTEL

Mr. Ghilain, *General Secretary* (in French). — We will now examine the summaries for Question VIII, which were published in Number 7 of the Daily Journal of the Session.

— These summaries were read out.

The President (in French). — Are there any remarks about this text?

— *No remarks were made.*

We will take the summaries for Question VIII as approved.

Summaries.

I. Organisation of the service in shunting yards.

« 1. In a general way, care should be « taken that the organisation of train « shunting and marshalling work meets « the operating requirements; there is « already great uniformity in the prin- « ciples governing organisation of the « work and the sequence of the opera- « tions.

« 2. The economical working of shun- « ting yards is strongly influenced by the « rational arrangement of the timetables. « These should have as their object, on « the one hand, the reduction to a mini- « mum of the time spent by wagons in « the shunting yards (when the wagons « are standing a very short time, better « use is made of them and the number « of wagons required is smaller) and, « the other hand, the attainment of « proper succession of the trains, ada- « ed to suit the capacity of the shunti « yards, which is also reflected in a b « ter use of the shunting gangs and lo « motives.

« 3. As exact a plan as possible of « work to be done in the shunting ya « and the way it is to be carried « should be drawn up, both as rega « time and work. The staff and locom « ves should be allocated in such a v « as to ensure their economical use; a s « ficient margin must be allowed for « quent abnormal demands, whereas « cases of special demands which ra « arise, the plan must be departed fr « The plan should provide for suita « connections between arriving and « parting trains.

« 4. The establishment of a work « plan pre-supposes a knowledge of « average time required for the diffe « operations and the amount of lab « needed to carry them out.

« The carrying out of an existing « does not usually lead to any diffic « in splitting up the trains, as long « the traffic is sufficiently dense.

« When making up trains, on the « trary, the diversity of the trains « the variable density of the traffic « fect the working time so much

the unit values calculated from the average number of trains are, as yet, only rarely sufficient for planning the work.

« Thus a regular and uniform rhythm of marshalling operations has, up to the present, only been realised in exceptional cases.

« Consequently a satisfactory planning of the shunting operations must depend to a large extent on the particular circumstances of the moment.

« 5. Mechanical equipment, remotely-controlled brakes, and automatic point operation have given excellent results in large shunting yards; the operations are speeded up and the efficiency of the yards increased.

« On large Railways with heavy traffic, it is thus possible to concentrate in large marshalling yards the work of making up trains, reducing as much as possible the work at small yards, and especially at junction stations.

« 6. The study of the organisation of marshalling yards has generally been less developed than that of splitting-up yards. Since the work of making up trains is that which involves the greatest expense in machines and locomotives, it is desirable that Administrations should study the most economical methods of making up trains, taking into account the preparatory work which can be done at the time of splitting up, thanks to a judicious allotment of tracks.

. Train services between marshalling yards.

« 1. If fast working is to be obtained, an essential condition is that marshalling yards be interconnected by trains which are not required to serve intermediate stations.

« 2. If the traffic arrives in sufficient « quantities, it is recommendable to « work it through to distant receiving « stations, avoiding one or more inter- « mediate shunting yards, provided the « time taken to collect the wagons in the « shunting yard before departure is « shorter than the time to be saved on « shunting and marshalling in interme- « diate shunting yards.

« 3. If the quantities of wagons to be « forwarded are small, so that the time « required to collect a sufficient number « for direct despatch to the most distant « receiving station is too long, by « making up lots of wagons which ar- « rive at the shunting yard and mars- « halling them as they are into a train « made up therein, all the work to be « done can be completed as quickly or « even more quickly if the time to col- « lect them is appreciably shorter.

« 4. There should be enough regular « trains to work the traffic experience « shows may be expected, and to obtain, « by good transfer possibilities, satisfac- « tory through train workings in the « case of long-distance goods traffic.

« 5. The intended running of optional « trains should be made known as « quickly as possible in order to avoid « delays in the conveyance of goods, « avoid interfering with the working of « the stations by blocking them up, and « to make good use of the locomotives « and staff required to work the optional « trains. The timetables for the optional « trains should be prepared at the same « time as those of the regular trains and « be inserted in the working timetables.

« 6. It is recommended that the orga- « nisation of the running of special « trains, on large Systems with dense « traffic, should not be left to the sta-

« tions, but should be entrusted to a dis-
« trict office (traffic control, dispat-
« cher) having wider jurisdiction.

III. *Estimation of the traffic to be dealt with and of the trains required.*

« 1. As regards the probable general
« trend of the traffic and the important
« individual loads, it is only possible to
« form an opinion some time beforehand
« by keeping in close contact with the
« consignors, by taking into account pre-
« vious experience, by railway and eco-
« nomic statistics and — a relatively short
« time ahead — by the demands for
« empty stock; there is no standard me-
« thod of solving these problems.

« 2. In the case of consignments al-
« ready handed in for despatch, there are
« preliminary advice methods, either
« between despatching and receiving sta-
« tions and marshalling yards, or through
« the medium of central offices which
« notify the information received from
« the departure stations to the other sta-
« tions concerned and, in some cases, to
« neighbouring Railways.

IV. *Advice to be given to the consignees and consignors.*

« 1. Nearly everywhere the consignee
« is advised of the arrival of his goods
« and of the fact that they are ready for
« off-loading, so that the wagons, sidings,
« and loading platforms can be made
« available again as quickly as possible.

« 2. In advising the consignee, no ac-
« count is taken of the fact that, accor-
« ding to general practice, he is inform-
« ed by the consignor of the day and
« hour of departure and consequently
« can calculate the probable day and
« hour of arrival, from his own expe-
« rience or with the help of a goods tra
« timetable or similar documents.

« Because of the active competition
« the road motor car, it seems importa
« for Railway Administrations to ex
« mine the possibility of advising th
« consignor as soon as possible of th
« probable date of arrival of the good

« 3. When the demands for wago
« are heavy, the advice notice — togeth
« with the intimation that the perio
« within which the goods are to be u
« loaded is shortened, if need be —
« particularly important; the prelim
« nary advice, by the last station of ca
« to the receiving station, of the prob
« ble time of arrival of goods of son
« importance, is to be recommended.

V. *Acceleration of the turn-round of empty stock.*

« The turn-round of empty stock
« accelerated by the following metho
« the application of which depends
« the particular conditions of the Ra
« way concerned and the kind of traf
« worked :

« *(a)* Concentration of the empty v
« gons at large collecting centres fr
« which they can be distributed to t
« consuming points;

« *(b)* Working empty stock towa
« the regions generally short of wago
« without special demands having to
« made;

« *(c)* Working the wagons in spec
« empty-stock trains, which do not sh
« in the marshalling yards and avoid
« unnecessary stops. These very li
« trains are formed with the maxim
« number of axles and their timi
« adapted to the small weight hauled;

« *(d)* At times of great demand
« rolling stock, in order to reduce

« turn-round time of the wagons, authority to reduce the load of trains below the nominal value, increased service of loading points, extension of working hours at stations and the preliminary notification to customers of the time that empty wagons will be at their disposal.

VI. *Use of containers and road-rail. wagons.*

« 1. Only some Railways, especially those with their own collection and delivery services, have left the experimental stage as regards the use of containers. It appears that the questions of the rates and conveyance between the railways and the consignor's or consignee's premises can be solved satisfactorily.

« 2. It is specially important in the case of large container traffic, to suitably arrange the transfer from road to rail vehicles and inversely. Especially useful for this purpose are mobile cranes, which run on the road alongside the railway wagons and economise on all shunting operations. Difficulties met with by the Railways in developing the use of large containers can mostly be traced to the lack of such « mobile cranes or other mechanical unloading equipment, at stations and on « the premises of consignors and consignees.

« 3. Small containers used for parcels « and special small consignments appear « to be advantageous, especially from « the point of view of the reduction of « transhipment operations, and to facilitate handling.

« 4. Undoubtedly, the use of containers for door to door transport has an « extremely favourable influence on the « ability of the railway to meet competition.

« 5. Road transport of railway wagons is only at present in use on a « few Railways. The use, by some Railways, of special road vehicles for carrying railway wagons has given satisfactory results. Nevertheless, the time « has not yet come for formulating a definite judgment.

« One can also consider, in order to « ensure « door to door » transport, the « use of lorries or trailers loaded unto « railway wagons at the nearest station « to the sending establishment and unloaded similarly at the nearest station « to the receiving establishment. »

[656. 254]

QUESTION IX.

Results obtained from the automatic and distant operation of signals and points, and from locomotive cab signals.

Preliminary documents.

Report (France and Colonies, Great Britain, Dominions and Colonies, Belgium and Colony, Luxemburg, America, China and Japan), by J. TUJA and A. LEMONNIER. (See *Bulletin*, January 1937, p. 137, or separate issue No. 15.)

Report (Italy, Switzerland, Jugoslavia, Bulgaria, Rumania, Greece, Turkey, Egypt, Spain, Portugal and Colonies), by Carlo BELLOMI and Gino MINUCCIANI. (See *Bulletin*, April 1937, p. 789, or separate issue No. 25.)

Report (Austria, Czechoslovakia, Denmark, Finland, Germany, Hungary, Netherlands and Colonies, Norway, Poland, Sweden), by A. MISZKE. (See *Bulletin*, April 1937, p. 1089, or separate issue No. 29.)

Special Reporters : Messrs. TUJA and LEMONNIER. (See *Bulletin*, June 1937, p. 1562.)

SECTIONAL DISCUSSION.

Joint Meeting held on June 10th, 1937,

by the 2nd and 3rd sections.

MR. PELLARIN IN THE CHAIR.

— The Meeting opened at 9.30 a. m.

The President (in French). — Gentlemen, today we are holding a joint meeting with the 2nd Section to discuss Question IX. Mr. TUJA, the *Special Reporter*, will begin the proceedings by giving us an outline of the Special report he drew up in collaboration with his colleague, Mr. LEMONNIER. After this we will consider in turn each of the summaries suggested.

Mr. Tuja, *Special Reporter* (in French). — Gentlemen, first of all I must say how much I regret the absence of my colleague, Mr. Lemonnier, Traffic Manager of the French State Railways, owing to a recent accident.

Mr. Lemonnier was especially well qualified to put the special report before you. Particularly competent in all matters appertaining to signalling, with which he has been concerned for many years, Mr. Lemonnier, who is also President of the French Railways' Signalling Committee, made full use of his wide

pread knowledge and lent himself whoeheartedly to the work of drawing up ur report, as well as our special report.

As I have the honour to take his place wing to his absence, I wish to begin by xpressing my sympathy with him, and I m sure you will all join with me in ishing him a speedy recovery.

Gentlemen, as is the custom, I will now ım up the essential points which seem me to result from the reports on Quesion IX. May I say in this connection ow much the reports by Messrs. Bellomi, inucciani and Miszke interested us on count of their admirable perspicuity id foresight.

You will no doubt have noticed that l the Reporters have dealt with Quesn IX, which is so important as regards e future signalling practice of the railays, in a very general way, leaving aside l the technical details, which moreover ere investigated at earlier Sessions. Ined it seemed to us that the time had me to try and get a working philosoıy from what has already been achiev, to serve as a guide for the future.

Three principal points arrested the rerters' attention :

1. The automatic block;
2. Power signal boxes;
3. Locomotive cab signals.

We will consider each of these in turn.

1. *The automatic block.*

First of all, as regards the value of this ethod, all railways seem to be unanious in recognising that the automatic ock is an excellent way of assuring pro r headway between trains on lines with avy traffic.

As regards the regulations governing e use of the automatic block, we will nsider the following points :

(a) Under what conditions should a block signal at « danger » be run past?

(b) What is the driver to do after running past such a signal?

(c) How is a stopped train to be protected?

As regards point *(a)*, all the railways normally require trains to stop at a block signal at « danger ».

As regards point *(b)*, once the train has stopped, some railways allow the driver to start again at once, but he must then run at sight. Other railways only allow him to start again after stopping a few minutes. Finally, on some railways the train can only start again after being authorised by telephone to do so.

In the summaries which will be discussed later on, all these solutions are mentioned, but some preference has been shown for the first of them.

There remains, moreover, to define what is meant by running cautiously. It means running at sight; certain railways limit the speed in addition; others are content merely to impose a speed limit. This restriction, which is not essential, also has some drawbacks, as the proposed summaries show.

Finally, as regards point *(c)*, how is a stopped train to be protected? In this case we find a great many different solutions. Certain railways, for example in Germany, Denmark, Poland and France, require no protection in addition to the signals; others require some more or less distant protection, sometimes after a certain time only. Others again only require protection if the train is likely to be caught up by another.

The summaries that will be put before you show, at least as far as short block sections are concerned, some preference for the method of relying on the automatic block alone, without supplementing it by hand signals.

As you will see later on, the summaries also deal with the important question of possible failure of the automatic block. Without going into details on this subject, I may say that the present state of technical knowledge undoubtedly makes it possible to fit excellent equipment and justifies great confidence in it.

On the other hand, I must mention the interesting summaries formulated by our Italian colleagues, Messrs. Bellomi and Minucciani, on the advisability of drawing up exact statistics of failures.

(2) *Power boxes.*

As you know, by this we mean signal boxes in which the points and signals are not worked by hand, but electrically, hydraulically, pneumatically or in some other way.

Generally speaking, in comparison with hand-operated signal boxes, power boxes have certain valuable advantages, in particular the automatic protection of stopped trains, indication locking of levers, route locking which prevents a second train running into the route before the first has cleared it, optical control of the signals as well as of the points, and, in a less general way, approach locking intended to prevent the apparatus of a route being moved for an approaching train once the route has been set for a previous train.

We must point out that the French railways use almost exclusively power boxes with route levers in which all the signals and points of a given route or part of a route are worked by means of a single lever. These boxes have been completely satisfactory, and seem to be particularly convenient for the signalmen. We believe that similar boxes are now being introduced in the United States.

I would like to make special mention of the centralised traffic control system (C. T. C.) with which the signals an points of a large section of line can l worked by means of a small number operating circuits; this system has bee largely used in the United States and ha made it possible to put off the very co siderable cost of doubling lines. We s our hopes on this system as regards th operation of certain single-track lin with very heavy traffic.

The third point relates to *locomoti cab signals.* Although cab signals cann be regarded as indispensable, since ce tain railways easily do without them, is certain that such equipment is usefu particularly on lines with heavy traff run over by high-speed trains. Obviou ly, steps must be taken to see that th driver's vigilance is not lessened by su equipment. The question of automat braking will, moreover, be dealt with a special chapter of the summaries.

There are few questions more compli ated than this matter of cab signals. F this reason, an analysis of the proble in order to throw more light upon would seem to be useful.

There are two distinct questions invo ed : first of all signalling on the locom tives, and then automatic braking of t trains.

As regards locomotive cab signals, th se may be based on two different conce tions : either signal repetition on the comotive when a distant signal is passe or else continuous cab signalling is fitte which is closely connected with the au matic block, and gives a continuous i dication on the locomotive of the state the line ahead.

In the case of signal repetition, seems that equipment of the induct type — without contact — is the m dependable, and I am glad to be able mention in this connection the very

resting equipment designed by Mr. Mi-ucciani, one of the Reporters on this uestion.

As for continuous signalling, obviously is is the most complete method of loco-otive cab signalling, and we must cer-inly compliment the great American ilway, the Pennsylvania Railroad, hich was the first to introduce this stem.

Now, what are we to say about auto-atic braking?

The numerous automatic braking devi-s can be grouped under two headings : ose which are independent of the speed the trains, and those which depend on it.

The former, which come into action hen a distant signal is passed at danger, ust include a cancelling device actuat-l by the driver when he has seen the gnal at danger. Under these conditions seems that when there are two men on e engine, this arrangement only increa-s the safety in comparison with simple b signals when both men are incapacit-ed at the same time.

Automatic braking depending on the eed, has received several very interest-g applications, particularly on the Ger-an railways, and is certainly better than e former method, but it does not seem have any additional advantages on li-s equipped with the automatic block d continuous cab signalling.

We have endeavoured to sum up all ese principles in summaries which will w be put before you.

The President (in French). — After r. Tuja's general outline of the Ques-n, we will discuss the summaries. ill the Special Reporter please read mmary 1 of the chapter on the *Auto-tic Block*.

Mr. Tuja (in French). — *Summary 1 :*

1. The automatic block, on heavily loaded lines, is an excellent means of providing adequate headway between trains running in the same direction, as regards both safety and the capacity of the line.

— *Adopted without discussion.*

Mr. Tuja (in French). — *Summary 2 :*

2. The block signal at « danger » should generally necessitate the train being brought to a standstill.

It appears advantageous. however, to allow certain heavy trains to run past certain block signals at danger, on steep rising gradients, without stopping.

Mr. Bound, *London Midland and Scottish Railway*. — I would like to slightly alter the summary by saying :

« It appears advantageous, however, to allow certain heavy *goods* trains to run past... ».

No such step would be taken in Great Britain in the case of heavy passenger trains.

Mr. Tuja (in French). — There is not a single country in which passenger trains are allowed to run past a signal at danger. However, as only a possibility is in question, the future might look after itself and provision be made for the option of letting, under certain conditions, heavy passenger trains run past a signal at danger. It is not a recommendation, but just a possibility.

Mr. Miszke, *Reporter* (in French). — We might say : « It appears advantageous, however, and possible... »

Mr. Tuja (in French). — I would prefer to say : « It seems interesting... » in order to stress the interest that seems to be attached to this point.

Lieut. Colonel Mount, *Ministry of Transport, Great Britain.* — Just now Mr. Tuja stated that « the future might look after itself ». It seems, however, that it would be well to stress the point that heavy goods trains should stop, and at the same time to recognise the possibility that they might be allowed to pass the signal. I therefore suggest saying « in exceptional cases it might be advantageous to allow some heavy goods trains to continue forward without stopping ».

Mr. Tuja (in French). — « When this is justified... »

Lieut. Colonel Mount. — That would be better. The wording would then be : « In cases where it appeared to be justified it might be advantageous to allow some heavy goods trains to continue forward... »

The President (in French). — Does the Special Reporter insist that this statement is not to refer only to goods trains?

Mr. Tuja (in French). — On the P. L. M. we have a 1 in 125 gradient in a tunnel, with extremely heavy passenger trains which stop at the signal. Who is to say that in a few years time we will not allow certain signals at danger to be run past? It would be a pity to make it impossible to do this. I myself do not believe such a restriction should be imposed; everyone will be left free to decide as he pleases. This is how the problem should be considered.

Mr. Bound. — I cannot agree with the new wording proposed by Mr. Tuja, viz. that « in certain justified cases... ». In Great Britain a driver is never allowed to run past a block signal at danger without first stopping. Such a step would un doubtedly weaken discipline whic should be strictly maintained for the sak of safety on the line.

The President (in French). — I thin the wording might satisfy Mr. Boun The possibility given in the summary i in fact, not to be taken as a rule appli able to all railways, but on the contrar allows each country to enforce regul tions agreeing with its own way of thinl ing, and what its employees are used t I think the wording suggested meets th case.

Mr. Palmieri, *Italian State Railwa* (in French). — I want to associate m self with the opinion expressed by M Bound. It seems to me, in fact, that would be as well to consider that this a question of an exceptional case. Th rule should be that the train always sto at a signal at danger, but it may happe that in certain quite exceptional cases may be advantageous not to require to stop, especially when it is a qustio of heavy trains on steep rising gradien

Mr. Tuja (in French). — I think w should say : « ... in certain justified c ses steps can be taken to avoid enforci a stop on certain heavy goods trains, a in exceptional cases, certain heavy pa senger trains... »

The complete new text would read :

« 2. The block signal at « danger should generally necessitate the tra being brought to a standstill.

Nevertheless, in certain exceptional a justified cases, steps can be taken to avo enforcing a stop on certain heavy trai at some block signals at danger, on ve heavy rising gradients. »

This wording takes Mr. Palmieri's mark into account, and does away w

ny doubt the English delegates may ave.

The President (in French). — Any emarks?

— *This new wording was adopted.*

The President (in French). — We ow come to summary 3 :

Mr. Tuja (in French). — *Summary 3 :*

3. After stopping (or exceptionally without opping as mentioned above) the danger dication of the block signal should mean at the driver is to proceed with caution. here appears to be no objection to the ain restarting immediately without further lo, as is done on many Railways.

— *Adopted without discussion.*

Mr. Tuja (in French). — *Summary 4 :*

4. A driver proceeding with caution when has met a block signal at « danger » ould run « at sight », i. e. at such a speed at at any moment he can stop on the length line in sight.

Some Railways require the driver, in dition to running at sight, not to exceed given hourly speed. It may be questioned hether this speed limit, besides some adntages, has no drawbacks. In any case, can be dispensed with.

Mr. Joly, *Paris Metropolitan Railway* n French). — May I point out that the ractice on the Paris Metropolitan Railay does not quite agree with the word- g of summaries 3 and 4. On our lines, e block signals are run past almost imediately after the train has stopped. ie regulations require a stop of 30 sends, after which the train may run past e signal. Running at sight is very imrtant on the Metropolitan, seeing that e trains are run at very short intervals. nsequently running at sight implies the joint responsability of two men : the driver and the guard, the latter authorising running at sight by a written order handed to the former and the guard placing himself in the driver's compartment. There is no speed restriction, but it is laid down that the speed shall be such that it is always possible to stop in the length of track in sight. In some sections, however, where the layout makes the visibility very poor, only 50 m. (160 ft.) for example, the speed is restricted to 6 km. (3.7 miles) an hour. These sections are marked by a special black and white sign painted on the walls. Apart from this exception, running at sight does not imply any speed restriction.

Mr. Palmieri (in French). — I entirely agree with the Special Reporter about restricting the speed. In principle, I do not think it is necessary to impose any speed restriction when running at sight, seeing that this implies that the speed of the train is such that it can be stopped if anything is in the way.

Certain railways do restrict the speed, however, and this step is justified for other reasons, for example if the block signal remains at danger owing to a failure in the automatic block on account of a broken rail, or some interruption in the track. In such cases, as it might be dangerous to let the signal be run past at speed, not only is running at sight prescribed, but a certain speed restriction imposed as well.

The President (in French). — What is the speed restricted to?

Mr. Palmieri (in French). — In Italy it is 25 km. (15.5 miles) an hour on lines equipped with the automatic block.

Mr. Tuja (in French). — In the se-

cond paragraph we might say : « It may be questioned whether this speed limit, besides having some advantages, especially in the case of a broken rail or interruption in the track, has not also some drawbacks; in any case it can be dispensed with. »

Mr. Palmieri (in French). — It seems to me that this wording is rather contradictory; on the one hand it states that the practice is advantageous in certain cases, and on the other that it can be dispensed with.

Lieut. Colonel Mount. — I would prefer to confine ourselves to the first sentence of the second paragraph : « Some railways require the driver, in addition to running at sight, not to exceed a specified speed in kilometres per hour ».

Mr. Tuja (in French). — I think it would be a good thing to point out that there are two different points of view, and these are not contradictory. In order to take Mr. Palmieri's remark into account, I suggest that we delete from the summary the last sentence : « in any case it can be dispensed with ».

Mr. Cancella de Abreu, *Ministry of Commerce and Communications, Portugal* (in French). — I think we should decide whether or not the advantages reported are greater than the drawbacks. In the case of a long straight section, a train running at sight can travel at a fairly high speed; consequently in certain cases, of a broken rail for example, an accident may occur. The summary should definitely recognise therefore that it is advantageous to impose a speed limit.

Mr. Tuja (in French). — I do not think that we should do this for several reasons.

First of all it is a fact that there is speed limit on most railways : for ample on the extensive railway syste in the United States. It is therefore u less to recommend a solution which only found exceptionnally at the prese time.

On the other hand there is no dou that though a speed limit is sometim justified, it has its drawbacks; for exa ple when the driver is forbidden to e ceed 25 km. or 30 km. an hour, it mea that he is led to run at these speed which are excessive in certain cases.

Finally it must be recognised that c cumstances may be different from o country to another, from one railway another, and even from one place to a other. In America, for instance, whe the block sections are short, a speed lim has less effect that in other countri such as Italy, where the sections a long.

The mentality of the driver should al be taken into account. In some cou tries it is harder to discipline the sta than in others. I think we would going too far if we worded the summa as suggested. It should be stated that speed limit has some advantages, but privilege should be attached to it.

Mr. Baticle, *Ministry of Public Work France* (in French). — From the poi of view of railway inspection, as regar operation we consider that it is advan geous to introduce a speed limit. It not incompatible with caution : it is po sible to run slowly and at sight. I cann agree with the point of view express by Mr. Tuja.

The President (in French). — Do Mr. Baticle object to the text stating th the system has advantages, but so drawbacks as well?

Mr. Baticle (in French). — No.

Mr. Lemaire, *Belgian National Railways Company* (in French). — I think would be better to keep the first sentence of the second paragraph and leave it the second. If certain Railways think at there are advantages while others ink just the opposite, it means that the tter have discovered some drawbacks. am therefore in favour of only keeping e sentence : « Certain railways require e driver, in addition to running at ght, not to exceed a given hourly eed. »

Mr. Tuja (in French). — I agree with r. Lemaire's suggestion.

Mr. Cancella de Abreu (in French). — ay I insist on the opinion I expressed st now. It should not be forgotten that is a question of abnormal circumstans; it is a question of block signals at nger. In my opinion a speed limit has indisputable advantage as regards the fety of the train and the lives for which e railway is responsible, and this ould be taken into account in the summaries. I want to insist, therefore, that e Meeting adopt the idea of recomending a speed limit in addition to runng at sight.

Mr. Sherrington, *London and North stern Railway*. — I agree with Mr. Canlla de Abreu's point of view. Mr. Tuja s referred to the position in the Unit States, where no restriction whatever being imposed on the driver when the ck signal is at « danger ». However, may mention one Railway which has opted quite a different practice. On s system the driver has to walk along track in order to ascertain the place ere the obstacle is located, and until he has discovered this, he is not allowed to proceed. This is consequently quite a different practice. And as the main advantage of it is greater safety, nothing should be done that would decrease such safety.

Mr. Tuja (in French). — I do not know what line Mr. Sherrington's example refers to. It must be a very unusual one. For my part I do not think this method a very satisfactory one, as it risks introducing difficulties in train running, likely to prove detrimental to safety.

Mr. Sherrington. — This method is applied on a very busy and fast line, between Chicago and the Pacific Coast.

Mr. Latrasse, *French Nord Railway* (in French). — I am of the same opinion as Messrs. Lemaire and Tuja, because I do not think the summaries can give a definite pronouncement upon a question which is only recognised by a few railways. This point requires a more thorough investigation before justifying a formal summary recommending the railways to impose a speed limit. I think we should say that certain railways impose such a speed limit, but there is no need to formulate a summary requiring all the railways to do so. Under these circumstances, I think we might delete the last sentence of summary 4.

The President (in French). — We will therefore only keep the first sentence : « Certain railways require the driver, in addition to running at sight, not to exceed a given hourly speed. »

Lieut. Colonel Mount. — I support Mr. Latrasse's proposal which was, moreover, put forward just now by other delegates and myself.

The President (in French). — I think that reason counsels the adoption of the suggestion made by Messrs. Mount, Lemaire and Latrasse. It would be rather difficult, and perhaps a little presumptuous to try and solve such a difficult question in such a short time, especially as at the present time many Railways who have a very thorough experience of the block system recommend either one or the other system, so that it is impossible to state with assurance which is the best. I propose therefore that we adopt as the second paragraph of summary 4 only the text read just now, that is to say the first sentence of the original text : « Certain railways require the driver, in addition to running at sight, not to exceed a given hourly speed ».

Mr. Cancella de Abreu (in French). — I think that instead of limiting ourselves to reporting facts, we should formulate very definite opinions. It is not a question of recommending such or such a method; what matters is to point out its advantages. There is no point in holding a Congress if we must limit ourselves to reporting facts; we must formulate opinions.

The President (in French). — I think this exchange of views should have made it possible for the Meeting to decide what it thinks.

Mr. Baticle (in French). — When speaking of the advantages of one or other method, its drawbacks should also be reported. For example there have been cases of accidents in a section where the driver had to run at sight. I have heard of accidents when the driver was running at sight at 50 km. (31 miles) an hour. A speed of 50 km. an hour might not be excessive on a straight section with good visibility, but if the train wer being worked by a driver who had not thorough knowledge of the line in ques tion, he might suddenly come to a curv where the visibility is reduced, and ther on account of this speed the visible par of the line would be shorter than th braking distance — and so you get th inevitable accident. There are also case in which a speed limit has prevented ac cidents, but I am not convinced that th fact that a given speed is authorised whe running at sight, has prevented accidents In one case perhaps it does, but it ma not in another. I would like to be tol of cases in which accidents have bee prevented by the fact that the driver wa running at a different speed than tha imposed.

Mr. Latrasse (in French). — Wha matters, is not so much restricting th speed to a given limit, but being able t stop within the section of line in sigh taking into account the total brake powe of the train.

It should be noted that a given spee limit may have a very different effect ac cording to the kind of train on which i is imposed. Mr. Palmieri spoke just no of a speed limit of 25 km. an hour. A this speed a railcar, for example, with po werful brakes can stop in 100 to 200 m A heavy goods train not equipped wit continuous brakes would require 300 t 400 m. to stop. Now, in a blocked up se tion the obstacle may be anywhere in th section, 100 m. or 3 km. from the begin ing of the section.

It would be very tiresome to require railcar to be able to stop within 100 m when the obstacle may be right at th other end of the section, especially whe the visibility extends to a kilometre o more.

In this way the train would be delayed o no purpose, and as you know any delay n working to the timetable is a possible ause of accidents. I recognise that a peed limit may make it possible to avoid ccidents in certains cases, but the fact hat such a restriction would in itself elay the trains might also lead to acci-lents.

Mr. Palmieri (in French). — When I nentioned a speed limit of 25 km. an our, I had in mind the conditions when ve installed the automatic block. The peed limit has remained at this figure. think that the suggestion having in view ne question of braking rather than speed estriction may be of some value; it cer-ainly would be if the driver were always ble to see in time that a rail is broken r that there is an interruption in the rack. But it may happen that he does ot see it, and in such a case the speed mit becomes a question of safety.

I think to settle the matter, we might ake a statement to the effect that : Certain railways have found it advanta-eous to require the driver, in addition) running at sight, not to exceed a given ourly speed. »

Mr. Tuja (in French). — I agree with is suggestion.

Mr. Latrasse (in French). — In my inion we might delete the word : hourly » which adds nothing to the eaning.

The President (in French). — And st say « ... a given speed ».

Mr. Bound. — It being understood at the remainder be deleted.

The President (in French). — I agree. The complete text of summary 4 thus becomes :

« 4. A driver proceeding with caution when he has met a block signal at « danger » should run « at sight », i. e. at such a speed that at any moment he can stop on the length of line in sight.

Some Railways have found it advantageous to require the driver, in addition to running at sight, not to exceed a given speed. »

If no one else has anything to say, we will consider this text as agreed. *(Agreed.)*

And so we come to Summary 5 :

Mr. Tuja (in French). — *Summary 5 :*

5. In short sections at least (not exceeding 3 km. = 1.9 miles) a good method of protecting trains stopped on the open road is to rely on the block and not to require the staff on these trains to resort to additional protective measures (except in case of derailment).

Mr. Barysz, *Polish State Railways* (in French). — I suggest adding in the brackets at the end : « and failure of the locomotive.

Mr. Tuja (in French). — Why?

Mr. Barysz (in French). — Accidents have occured owing to this in Poland. Because of some failure on the locomotive, a train had to stand rather a long time on the line. Another train started from a neighbouring station in the meantime and ran into the first. It seems to me therefore that damage to the locomotive can be considered as similar to derailment. In both cases the train cannot proceed.

Mr. Tuja (in French). — The case of derailment seriously affects the safety, as there is danger of the rails being no longer connected together electrically. When

something goes wrong on the locomotive, this is primarily a traffic question. When a train has to remain standing for a long time, obviously steps must be taken to prevent congestion. I suggest the following addition : « When the train has to remain standing for some time, steps must be taken to prevent accumulation of the following trains. »

Mr. Barysz (in French). — Agreed.

Mr. Tuja (in French). — Or to make it more general we might say : « In case of failure or prolonged stop of a train, steps must be taken to prevent accumulation of the following trains ».

Mr. Le Besnerais, *French Nord Railways* (in French). — I do not think this sentence should be added. We are going right outside the question. We are now discussing safety and I see no reason for dealing with this particular matter which should form part of a more general investigation : Measures to prevent the traffic being upset by failure of the block or locomotives. It would be better to leave the summary as it is, i. e. deal with safety and nothing else.

Mr. Baticle (in French). — On certain French Railways the length of block sections in which trains need not be protected has been brought back to 3 500 m. (2.2 miles).

Mr. Tuja (in French). — With the manual, not the automatic block.

Mr. Baticle (in French). — If protection is not required in short blocks, this is because it is considered that the driver will not have time to get up speed again. If the block section is a long one, the driver may get up too much speed. Limiting the reliance on the automatic block comes to the same thing as recognising that it is a good thing to impose a speed limit.

Mr. Tuja (in French). — Would it not be best to keep the original text?

Mr. Bound. — It is a case either of a train delayed through the occupation of the track by another train, or of an unforeseen delay. The end of the summary should be altered in a more general way instead of mentioning only the case of derailment. When unforeseen delays occur, special steps must be taken.

Mr. Tuja (in French). — The idea is that the train must be protected when there is any danger of the automatic block no longer assuring this protection, for example in the case of derailment and naturally apart from the case in which there is likelihood of the automatic block failing.

Mr. Palmieri (in French). — If the automatic block fails, I am wondering how the train staff can find out that that is why it is not working. In these circumstances would it not be better to have a more general formula and say, as Mr. Bound suggested : « ... when unforeseen delays occur ».

Mr. Tuja (in French). — I did not make myself understood properly. When the signal is at danger, the train staff does not know whether this is because there is a train ahead, or because of a block failure. I was referring to the case in which the block signal may remain off behind the train in case of derailment when there is not a sufficient number of wheels on the track to shunt it.

Mr. Baticle (in French). — Could we ot say : « ... when a relatively large umber of pairs of wheels are derailed. »

Mr. Tuja (in French).— I see no objection. I would suggest a more general ording, however : « ... except in certain particular cases laid down by the rious regulations. »

The President (in French). — Does eryone agree that summary 5 should e adopted with the modification of the ords in brackets as proposed by Mr. uja?

— *Agreed.*

Mr. Tuja (in French). — *Summary 6 :*

6. In the case of the automatic block with echanical signals, some Railways consider prudent to provide a « continuity » device hich maintains a block signal at « danger » ter the corresponding section has been eared, in the exceptional case in which the llowing block signal has not gone to « danr » after a train has passed.

This measure gives certain guarantees, but s some drawbacks. The best solution apars therefore to use light signals instead mechanical signals whenever possible.

— *Adopted without discussion.*

Mr. Tuja (in French). — *Summary 7 :*

7. Whatever type of signal be used, even the case of light signals, some Railways em it necessary to take precautions (dou- relays, or continuity devices) against the ceptional case of a block relay not beming de-energised when a train has passed, hereas other Railways, chiefly to reduce e number of times the block signals unduly to « danger », take no such additional ecautions.

The essential thing is to use excellent ays only.

Mr. Joly (in French). — The Paris Metropolitan Railway, as a protection against the block relay not becoming de-energised, duplicates the block relays. We have obtained excellent results with this system. We have not experienced any increase in the number of times the block signals go to danger untimely through duplicating the relays, and our statistics show that there is approximately one failure for every 800 000 movements of the signal.

Mr. Tuja. (in French). — I should have thought that double relays would have been unnecessary on the Metropolitan. It should be difficult for anything to go wrong, as the sections are so short.

Mr. Joly (in French). — On the average 150 m. (492 ft.).

Mr. Tuja (in French). — As all the installations on the Metropolitan are so near together, it is very easy to keep a close check on them.

— *Summary 7 was adopted without change.*

Mr. Tuja (in French). — *Summary 8 :*

8. The coded block, although in use only a short time, appears to be a particularly safe form of automatic block.

— *Adopted.*

Summary 9 :

9. Conditions under which light vehicles as well as vehicles with pneumatic tyres can be allowed to run over automatic block sections with safety still require investigation.

— *Adopted without alteration.*

Mr. Tuja (in French). — We now come to the Chapter dealing with *Power boxes.*

Summary 10 :

10. Power boxes with route levers, in which one lever operates the whole of the points and signals on a route, appear to specially facilitate the working.

Mr. Palmieri (in French). — I think this summary is rather too general. There are cases in which the service can be impeded by route levers. If many shunting movements of different lengths (very long or very short) or special movements have to be made in a station, individual levers must be used. It might therefore be as well to say that « ... in certain cases... » the route lever may facilitate the service.

Mr. Tuja (in French). — In power boxes with route levers there are special arrangements to prevent the drawbacks mentioned by Mr. Palmieri, so that certain routes are divided into sections (points grouped 2 or 3 together), or improved devices are used whereby it is possible to send another train after the first before the route is completely cleared. We might add to summary 10 : « ... The use of such boxes requires a close investigation into the shunting question. »

The President (in French). — I suggest the following addition : « ... provided they contain apparatus which lends itself to all kinds of train movements. »

Mr. Palmieri (in French). — I agree with this latter proposal.

The President (in French). — Summary 10 will therefore read as follows : « Power boxes with route levers, in which one lever operates the whole of the points and signals on a route, appear to specially facilitate the working, provided they contain apparatus which lends itself to all kinds of train movements. »

Mr. Tuja (in French). — *Summary 11*

11. At the present time there is a tendency to use very small (miniature) levers and replace the interlocking properly speaking, i. e. locking the levers into position, by directly cutting the operating circuit of the apparatus in question by means of a relay. These new methods seem to be at least as safe as those used in power boxes of other types.

Mr. Olivier, *Belgian National Railway Company* (in French). — In Belgium we are beginning to use boxes with route levers. We have retained mechanical interlocking which seemed a guarantee for safety as it meets any failure in the interlocking, and I think it would be as well to delete the last sentence : « These new methods seem to be at least as safe as those used in power boxes of other types. »

Mr. Tuja (in French). — This sentence was intended to report a tendency that was noticed.

Mr. Olivier (in French). — It is not a general tendency.

Mr. Tuja (in French). — Moreover, I do not see any other objection to deleting this sentence.

The President (in French). — Summary 11 would consequently be adopted without the last sentence. *(Agreed.)*

Mr. Le Besnerais (in French). — I would like to insist, however, that this deletion should not be considered in a depreciatory sense.

Mr. Tuja (in French). — *Summary 12 :*

12. Power boxes lend themselves particu-rly well to providing all the safety condi-ons that can be desired. It is to be re-mmended that provision be made in these xes for section locking, point locking, ute locking, and approach locking.

— *Adopted without discussion.*

Mr. Tuja (in French). — *Summary 13 :*

13. Issuing instructions covering the fai-res of electric devices preventing point or gnal movements in a power box is a deli-te question. The trains affected should t be allowed to pass at speed the whole ne the device is out of order. It is re-mmended, moreover, that any electric terlocking out of order should be cancelled the signalmen, and « repeater » devices ed each time the defective equipment is erated.

Mr. Bound. — When a train is stopped the line, the signalman is apt to over-ok that the stop is due to the fact that e line is occupied by another train; ere is the possibility that he thinks the use is a failure in the circuit.

Mr. Tuja (in French). — I agree, but distinction should be made : the failure ay cause the signal to go to danger, d in this case one acts as if the signal as at danger because of the presence of train; but a failure may occur in which e signal does not go to danger when it ould, and these are the cases which re-ire special precautions. This was what intended to say.

— *After these explanations, Summary was adopted unchanged.*

Mr. Tuja (in French). — *Summary 14 :*

14. Long-distance point operation, by eans of devices with few control circuits and operating circuits, gives excellent results and appears likely to be developed considerably, in particular for operating single-track lines with heavy traffic, as it may make it unnecessary to double such lines.

— *Adopted.*

Mr. Tuja (in French). — *Summary 15 :*

15. Automatic point operation by the trains themselves also gives good results, at least with simple track layouts.

— *Adopted without modification.*

Mr. Tuja (in French). — We now come to the Chapter : *Cab signalling.*

Summary 16 :

16. It is desirable to facilitate the work of the driver by equipping the engines with signal repeating devices or with continuous signalling; automatic braking can be added with either arrangement.

This equipment is specially desirable on busy lines or lines run over by high-speed trains.

Mr. Müller, *Swiss Federal Railways* (in German). — Before we begin to discuss summary 16, there are some facts I want to put before the Meeting. In Messrs. Bellomi and Minucciani's report, which covered the Swiss Railways, it is stated that none of the Administrations concerned supplied any information about cab signalling. I want to make it clear that the information sent in by the Swiss Federal Railways failed to arrive in time owing to a mistake made in one of the Administration's offices.

The whole of the electrified system of the Federal Railways is equipped with locomotive cab signalling together with automatic braking (Signum system). I wanted to say this so as to call your

attention to the extensive use of this method of signalling on the Swiss railways.

Mr. Tuja (in French). — I can reassure Mr. Müller. Messrs. Bellomi and Minucciani made a supplementary report analysing in detail the information sent in late by the Swiss Federal Railways. This supplementary report was published in the April 1937 number of the *Bulletin* together with the main report, and we found it particularly interesting.

Mr. Bound. — I wish to draw attention to the English text of the second paragraph. I should like to substitute « mainly required » for « specially desirable ».

Mr. Tuja (in French). — That agrees with the French wording » spécialement indiquée ».

Mr. Le Besnerais (in French). — It is merely a question of form : in the text as worded « This equipment... » at the beginning of the second paragraph seems to refer to both cab signals and automatic braking. All that was meant was that the use of cab signalling is mainly required ».

Mr. Tuja (in French). — We might say : « This cab signalling equipment is mainly required... » etc.

Mr. Le Besnerais (in French). — My remark was intended to prevent any confusion in the wording.

Mr. Tuja (in French). — Summary 16 will therefore remain unchanged except for the beginning of the second paragraph which will be altered to read : This cab signalling equipment is moreover mainly required... » etc.

— *Agreed.*

Summary 17 :

17. Steps should be taken to prevent th driver becoming less vigilant when suc equipment is provided.

— *Adopted.*

Mr. Tuja (in French). — *Summary 18*

18. Distant signals (warning and spee restriction) in the danger position shou be repeated. It is also useful to repeat the signals when off.

Mr. Müller (in German). — It seem to me that there is some contradictio between the second sentence of summa 18 and summary 17 which has just bee adopted. In summary 18 it says : « it also useful to repeat these signals wh off ».

The report shows that the repetitio of signals when off may also be usefu seeing that it proves that the equipme is working properly. Accordingly, I thi this fact should be mentioned in Su mary 18, to take the idea expressed Summary 17 into account. If the signa are repeated in the off position, the po tion at which they are usually passed, t driver may get into the habit of countin on the repeating equipment and his vig ance may be lessened, whereas in Su mary 17 we stated that steps should taken to see that the vigilance of the dr ver is not decreased.

Mr. Tuja (in French). — The idea summary 18 is to mention the equipme used, and I see no objection to compl ing the last sentence in the followi way : « It is also useful to repeat the signals when off, in order to check the proper working at all times. »

The President (in French). — I su gest saying : « It is also useful in ord

have a permanent check on the work-
g of the equipment, to repeat these sig-
ls when off. »

Mr. Palmieri (in French). — Summa-
18 says : « Distant signals (warning
d speed restriction) in the danger po-
tion should be repeated. It is also use-
l to repeat these signals when off. »
ndoubtedly this is a safety measure;
e repetition is extremely useful, spe-
ally in the case of high-speed trains.
me of these signals are speed restric-
n signals and these signals in the off
sition are just as dangerous for the
gh-speed trains as the signals in the on
sition. It is therefore also useful to
peat the signals restricting the speed,
their off position. The summary
ight be completed in this way.

Mr. Tuja (in French). — From Mr.
lmieri's remark I gather he is perhaps
tting a different interpretation on cer-
in words. In France the word « ferme-
re » does not mean « arrêt ». I agree
at the speed restriction signal should
repeated when it means the driver
ust slow down.
We might say : « Distant signals
arning and speed restriction) in their
strictive position... ».

Mr. Palmieri (in French). — On the
lian Railways there are warning sig-
ls which when off give the driver an
lication that the next signal will be off
d can be run past at reduced speed.
hen the signal requires the speed to be
luced, it should be repeated.

Mr. Tuja (in French). — I suggest we
: « Distant signals giving a restrictive
lication such as « caution » or « slow
wn ».

Mr. Palmieri (in French). — I agree.

Mr. Latrasse (in French). — « Restrictive » is perhaps not very correct. We might say : « ... giving a « caution » or « slow down » indication... etc. »

Mr. Tuja (in French). — I agree.

Mr. Poncet, *French Est Railways* (in French). — I would like to see an addition made to the text under discussion, so that it would read... « should be repeated and *registered* on the locomotives ».

I would also like to go back very briefly to the question of repeating signals when off. I do not think that there is no object in giving the driver an audible warning when he runs past an off signal, especially when the repeating device incorporates an arangement for transmitting the signals by contact. In fact when only signals at danger can be audibly repeated, there may be a tendency on the part of the driver to think that when there is no audible indication the signal must be off. Audible repetition of off signals has the advantage of avoiding this risk of misinterpretation. When he is not given any audible indication the driver necessarily concludes that the cab signalling equipment is out of order, so that he has a constant check on its working in this way.

I might add that the audible repetition of signals should in every case be completed by some method of checking the driver's vigilance, by requiring him to work some vigilance recording device when he comes to a signal at danger.

Mr. Tuja (in French. — I see no objection to stating that the signals in question should be repeated and recorded

on the locomotive. The complete text would therefore be :

« 18. Distant signals giving a warning or speed restriction indication should be repeated and registered on the locomotive. It is also useful, in order regularly to verify that the apparatus is in working order, to repeat and register these signals when off. »

Mr. Goursat, *French Nord Railway* (in French). — Instead of « in the off position » I suggest saying « giving a *line clear* indication ».

Mr. Tuja (in French). — I do not agree. *Off* is more general than *line clear*.

The President (in French). — Does everyone agree about the wording Mr. Tuja has just read?

— *This text was approved.*

Mr. Tuja (in French). — *Summary 19 :*

19. Cab signalling equipment with purely mechanical transmission of the indications is only suitable for trains running at low speeds.

— *Adopted without debate.*

Mr. Tuja (in French). — *Summary 20 :*

20. Equipment with electrical (contact) transmission should preferably give the « danger » indication by cutting off the current.

If, on the contrary, it gives the « danger » indication by emitting current, it must be maintained in very good order.

Mr. Barysz (in French). — All equipment used in connection with the safe running of the trains must, of course, be maintained very carefully.

Mr. Tuja (in French). — At the en of the paragraph I suggest we replace th words « in very good order » by « in par ticularly good order » to stress the fac that the equipment of this sort require better maintenance than the rest. Th idea is not that the rest should be neglect ed to its advantage, but as it is harde to control the proper working of suc equipment, we might say «... in particu arly good order ».

Mr. Palmieri (in French). — I do no think the second paragraph is really ne cessary. What it says is : « Equipmen with electro-mechanical (contact) trans mission should preferably give the « dan ger » indication by cutting off the cu rent ». As the word « preferably » i used in this paragraph, I think the se cond paragraph might very well b omitted.

Mr. Tuja (in French). — The secon paragraph was added because in Franc the indication is given by emitting cu rent, and owing to careful maintenanc these arrangements have given good re sults.

Mr. Poncet (in French). — I am won dering if it would not be better to delet the second paragraph which seems to con trast equipment which emits current wit that in which the current is cut off whe the signalling is *on*. In actual fact dev ces giving the *on* indication when th current is cut off are of composite de sign and the current is cut off by mech anical action. When the connection be tween the track and engine is of th electrical contact type, the indication in fact always given by current emissio

Mr. Tuja (in French). — I note th

teresting remark that arrangements hich operate when the current is cut f are always electro-mechanical, which the case on the Great Western Rail-ay. This was the reason we said « pure-mechanical » in summary 19.

The wishes of the majority of the De-gates will be met if the second para-aph is deleted.

The President (in French). — With uipment giving the indication by emis-on of current, it is desirable that the iver should be able to check the proper orking of the apparatus frequently. I ink this is important with equipment orking by emission of current.

Mr. Tuja (in French). — We want to ow the advantage the technical expert es in equipment working by cutting off e current.

The President (in French). — Sum-ary 20 will therefore end with the first ragraph and will only state :

« 20. Equipment with electrical (con-ct) transmission should preferably give e « *signal on* » indication by cutting f the current. »

— *Approved.*

Mr. Tuja (in French). — *Summary 21 :*

21. Non-contact devices are definitely bet- than those working by contact.

— *Adopted.*

Mr. Tuja (in French). — *Summary 22 :*

22. It is desirable as a rule to retain the manent-way signals, even when cab nals are fitted on all the locomotives run-ng on the line.

Mr. Bound. — I suggest that the be-nning of this text be altered : « It is desirable as a rule to retain the permanent way signals ». As a matter of fact, this is misleading as permanent way signals are of a temporary character, warning drivers of slacks due to relaying, etc. I would be satisfied if it stated only « signals » in the English text. This alteration does not affect the French wording.

Mr. Tuja (in French). — We might just say « signals ». We only said « permanent way signals » to stress the fact that this did not apply to the cab signals. Mr. Bound's suggestion is a good one. The English wording will be changed accordingly.

— *Agreed.*

Mr. Tuja (in French). — *Summary 23 :*

23. There does not appear to be any disadvantage in giving one more indication on the engines than those given by the permanent-way signals (advance warning, for example). This is particularly valuable in the case of a section of line run over by some ultra-fast trains for which the permanent-way signalling has become inadequate.

Mr. Le Besnerais (in French). — Perhaps the idea of fast trains only should not be taken into account, because there are trains running at various speeds over the lines. If all the trains were high-speed trains, there would be no need to give advance warning.

Mr. Tuja (in French). — We might say... « in the case of a section of line run over by trains at different speeds ».

Mr. Le Besnerais (in French). — Exactly.

Mr. Bocquet, *Paris-Lyon-Méditerranée*

Railways (in French). — The value of an advance warning seems to be closely connected with the braking possibilities of the trains. Generally speaking such a warning is advantageous when the braking distance is greater than the distance between the warning signal and the stop signal. The case considered in point 23 seems to me to be that of ultra-fast trains which owing to insufficient braking power cannot be stopped in the distance between the warning signal and the stop signal, though this distance is sufficient in the case of the ordinary trains.

Mr. Tuja (in French). — We might say : « ... having the same braking power as the other trains ».

Mr. Palmieri (in French). — These are certain special cases in which the existing signals are not altogether adapted to the speed and braking conditions of certain trains. It may happen that the braking distance does not suit the ultra-fast trains.

Mr. Tuja (in French). — I am wondering if the original wording does not express the meaning best. Perhaps we might delete the comma between « rapides » and « pour » in the French text.

The President (in French). — I think the original text gives a very good idea of the difficulty experienced. Does everyone agree that it should be maintained?

— *Agreed.*

Mr. Tuja (in French). — *Summary 24 :*

24. Undoubtedly, from the working point of view, and also to some extent from that of safety, continuous signalling is better than signal repeating, even with non-contact apparatus.

Mr. Bound. — The English word « un doubtedly » at the beginning of this paragraph seems to correspond to the French term « indiscutable », but appears somewhat to strong, I suggest its omission.

Mr. Tuja (in French). — If we said « There seems to be no doubt ».

Mr. Bound. — I agree; this expression is less categorical.

— Summary 24 was finally adopted in the following form :

« 24. From the working point of view and also to some extent from that of safety, there appears to be no doubt that continuous signalling is better than signal repeating, even with non-contact apparatus. »

Mr. Tuja (in French). — *Summary 25*

25. Continuous signalling is much more costly than signal repeating, even in the case of non-contact apparatus, when the line is not already equipped with the automatic block. This system, therefore, can only be considered by railways already equipped or to be equipped with the automatic block on a large scale.

The Railways which for some reason or other are not proposing to install the automatic block on a large scale are rather led to adopt signal repetition preferably by means of non-contact equipment.

— *Adopted without alteration.*

Mr. Tuja (in French). — *Automatic braking.*

Summary 26 :

26. Automatic braking limited to home signals passed at « danger » raises no difficulty in principle, but is only suitable for lines run over at low speeds.

Mr. Bound. — At the end of the paragraph, I would like to say « medium speed » instead of « low speed ».

Mr. Tuja (in French). — We might say : « on lines that are not run over by high-speed trains.

— *Adopted in this altered form.*

Mr. Tuja (in French). — *Summary 27 :*

27. On lines run over at high speeds, the brakes should be applied automatically at the distant signal. The application of the brakes can be independent of train speeds or depend thereon.

— *Adopted.*

Mr. Tuja (in French). — *Summary 28 :*

28. Automatic braking independent of the train speed always involves the provision of means by which the driver can cut out the automatic action when he has sighted the signal. Under these conditions automatic braking appears to be superior to signal repeating only in the very exceptional case of both driver and fireman being unable to operate the brake.

Mr. Müller (in German). — At the end of the second paragraph of summary I mention is made of the case in which neither the driver nor the fireman can operate the brake. I would also like to mention the case in which there is only one man driving the engine, as is the case on the Swiss Federal Railways with electric traction.

Mr. Tuja (in French). — I see no objection. The system recovers a certain advantage when there is only one man in the engine by himself.

Mr. Joly (in French). — We might say : « in the event of the total incapacity of the engine crew ».

Mr. Tuja (in French). — Certainly.

Mr. Bound. — I suggest that the word « always » between « speed » and « involves » be deleted. The second paragraph should also be left out.

Mr. Tuja (in French). — It is a very good idea and it would be a pity not to include it. On the other hand I see no objection to deleting the word « always ».

Mr. Bound. — It is not only the case of the staff being incapacitated. There is also the case of the driver being less careful, less attentive; in this case account should be taken of the fact that the automatic brake comes into action.

Mr. Tuja (in French). — The driver operates the cancelling device before reaching the signal at danger. No automatic braking occurs when the driver has been on the alert.

Mr. Bound. — There are in England 2 700 miles of track equipped with an automatic braking system which has given entire satisfaction; drivers themselves prefer it.

Mr. Tuja (in French). — The brake is not applied if the driver cancels the automatic brake action. The reporter did not in any way intend to condemn automatic braking; he only wanted to point out that the only additional advantage in comparison with cab signalling is when the driver fails in his duty. If you like, we can leave out the words « very exceptional » and say « in the event of incapacity of the engine crew ».

Mr. Le Besnerais (in French). — In the event of *total* incapacity.

Mr. Bound. — I am under the impres-

sion that the Special Reporter has not properly grasped what I mean. We are dealing with the exceptional case of the train staff being incapacitated or unable to work the brake. In such a case it is advantageous, even indispensable, that the brakes be automatically applied. It may occur that there is no incapacity properly speaking, but that a special circumstance wholly absorbs the staff's attention : then they do not sight the signal and the automatic brake application shows considerable advantage.

Mr. Tuja (in French). — I quite agree.

Mr. Le Besnerais (in French). — In this case the signals are repeated.

Mr. Tuja (in French). — This is the only case in which the system is of value. I think we well mean the same thing. I suggest saying : « This braking is particularly valuable in the event of total incapacity of the engine crew ». The implication is not to be taken as depreciatory in any way.

The President (in French). — Does everyone agree to this wording?

Mr. Le Besnerais (in French). — I want it to be put to the vote. I preferred the old wording.

The President (in French). — It comes to very much the same.

Mr. Le Besnerais (in French). — What about saying : « Consequently this braking is specially superior to signal repeating alone and continuous cab signalling alone, in the event of total incapacity of the engine crew » instead of the original second paragraph?

The President (in French). — Th new complete text would thus be :

« 28. Automatic braking independent o the train speed involves the provision o means by which the driver can cut ou the automatic action when he has sighte the signal. Consequently this braking i especially superior to signal repetitio alone and continuous cab signallin alone, in the event of the total incapacit of the engine crew. »

— *Adopted.*

Mr. Tuja (in French). — *Summary 29*

29. Automatic braking depending on th train speed is more valuable than the forme especially in the case of ultra-high spee trains; it is incontestably of lower valu when the engines are equipped with ca signals.

— *Summary 29 was adopted witho discussion.*

The President (in French). — Th brings us to the end of this interestin question.

Mr. Le Besnerais (in French). — I am sure I am expressing the wishes o all the Delegates in thanking our Pres dent for the masterly way in which h has directed the discussions and enable us to formulate interesting summarie *(Applause.)*

The President (in French). — I thai Mr. Le Besnerais for his kind remark but his compliments should really b paid to Mr. Tuja, the *Special Reporte* who in collaboration with his colleagu Mr. Lemonnier, was able to formula for this difficult and interesting que tion, summaries which, taken as a whol required very little discussion. *(A plause).*

— The Meeting ended at 12.45 p. m.

DISCUSSION AT THE PLENARY MEETING.

June 11th, 1937.

Mr. LE BESNERAIS, Vice-President, in the Chair.
General Secretaries : Messrs. P. GHILAIN, de BOYSSON and CAMBOURNAC.
Assistant General Secretaries : Sir H. Nigel GRESLEY and Dr. Th. KITTEL.

Mr. Ghilain, *General Secretary.* — We now come to the examination of the summaries for Question IX, which were published in No. 8 of the *Daily Journal of the Session.*

— *No remarks were made during this examination.*

The President (in French). — We will therefore take the summaries for Question IX as agreed.

Summaries.

Automatic block.

« 1. The automatic block, on heavily loaded lines, is an excellent means of providing adequate headway between trains running in the same direction, as regards both safety and the capacity of the line.

« 2. The block signal at « danger » should generally necessitate the train being brought to a standstill.

« Nevertheless, in certain exceptional and justified cases, steps can be taken to avoid enforcing a stop on certain heavy trains at some block signals at danger, on very heavy rising gradients.

« 3. After stopping (or exceptionnally without stopping as mentioned above) the « danger » indication of the block signal should mean that the driver is to proceed with caution. There appears to be no objection to the train « restarting immediately without further ado, as is done on many Railways.

« 4. A driver proceeding with caution « when he has met a block signal at « « danger » should run « at sight », « i. e. at such a speed that at any moment he can stop on the length of line « in sight.

« Some Railways have found it advantageous to require the driver in addition to running at sight, not to exceed « a given speed.

« 5. In short sections at least (not exceeding 3 km. = 1.9 miles) a good « method of protecting trains stopped on « the open road is to rely on the block « and not to require the staff on these « trains to resort to additional protective measures (except in certain particular cases laid down by the various « regulations).

« 6. In the case of the automatic block « with mechanical signals, some Railways consider it prudent to provide « a « continuity » device which maintains a block signal at « danger » after « the corresponding section has been « cleared, in the exceptional case in « which the following block signal has « not gone to « danger » after a train « has passed.

« This measure gives certain guarantees « but has some drawbacks. The best solution appears, therefore, to use light

« signals instead of mechanical signals « whenever possible.

« 7. Whatever type of signal be used, « even in the case of light signals, some « Railways deem it necessary to take pre- « cautions (double relays, or continuity « devices) against the exceptional case « of a block relay not becoming de-ener- « gised when a train has passed, whereas « other Railways, chiefly to reduce the « number of times the block signals un- « duly go to « danger », take no such « additional precautions.

« The essential thing is to use excel- « lent relays only.

« 8. The coded block, although in use « only a short time, appears to be a « particularly safe form of automatic « block.

« 9. Conditions under which light ve- « hicles as well as vehicles with pneu- « matic tyres can be allowed to run over « automatic block sections with safety « still require investigation.

Power boxes.

« 10. Power boxes with route levers, « in which one lever operates the whole « of the points and signals on a route, « appear to specially facilitate the work- « ing, provided they contain apparatus « which lends itself to all kinds of train « movements.

« 11. At the present time there is a « tendency to use very small (miniature) « levers and replace the interlocking pro- « perly speaking i. e. locking the levers « into position, by directly cutting the « operating circuit of the apparatus in « question by means of a relay.

« 12. Power boxes lend themselves « particularly well to providing all the « safety conditions that can be desired. « It is to be recommended that prov « sion be made in these boxes for se « tion locking, point locking, rou « locking, and approach locking.

« 13. Issuing instructions covering t « failures of electric devices preventi « point or signal movements in a pow « box is a delicate question. The trai « affected should not be allowed to pa « at speed the whole time the device « out of order. It is recommended, mor « over, that any electric interlocking o « of order should be cancelled by t « signalmen and « repeater » devic « used each time the defective equipme « is operated.

« 14. Long-distance point operatio « by means of devices with few contr « circuits and operating circuits, giv « excellent results and appears likely « be developed considerably, in partic « lar for operating single-track lir « with heavy traffic, as it may make « unnecessary to double such lines.

« 15. Automatic point operation by t « trains themselves also gives good r « sults, at least with simple track layou

Locomotive cab signalling.

« 16. It is desirable to facilitate t « work of the driver by equipping t « engines with signal repeating devi « or with continuous signalling; auton « tic braking can be added with eith « arrangement.

« This cab signalling equipment « moreover mainly required on busy « nes or lines run over by high-sp « trains.

« 17. Steps should be taken to p « vent the driver becoming less vigil « when such equipment is provided.

Signal repetition.

« 18. Distant signals giving a warning or speed restriction indication should be repeated and registered on the locomotive. It is also useful, in order regularly to verify that the apparatus is in working order, to repeat and register these signals when off.

« 19. Cab signalling equipment with purely mechanical transmission of the indications is only suitable for trains running at low speeds.

« 20. Equipment with electrical (contact) transmission should preferably give the « danger » indication by cutting off the current.

« 21. Non-contact devices are definitely better than those working by contact.

ontinuous signalling on the locomotive.

« 22. It is desirable as a rule to retain the signals, even when cab signals are fitted on all the locomotives running on the line.

« 23. There does not appear to be any disadvantage in giving one more indication on the engines than those given by the existing signals (advance warning, for example). This is particularly valuable in the case of a section of line run over by some ultra-fast trains for which the existing signalling has become inadequate.

Comparison.

« 24. From the working point of view, and also to some extent from that of safety, there appears to be no doubt that continuous signalling is better than signal repeating, even with non-contact apparatus.

« 25. Continuous signalling is much « more costly than signal repeating, even « in the case of non-contact apparatus, « when the line is not already equipped « with the automatic block. This sys- « tem, therefore, can only be considered « by railways already equipped or to be « equipped with the automatic block on « a large scale.

« The Railways which for some reason « or other are not proposing to install « the automatic block on a large scale « are rather led to adopt signal repeti- « tion, preferably by means of non-con- « tact equipment.

Automatic braking.

« 26. Automatic braking limited to « home signals passed at « danger » rai- « ses no difficulty in principle, but is « only suitable for lines that are not run « over by high-speed trains.

« 27. On lines run over at high speeds, « the brakes should be applied automa- « tically at the distant signal. The appli- « cation of the brakes can be indepen- « dent of the train speeds or depend the- « reon.

« 28. Automatic braking independent « of the train speed involves the provi- « sion of means by which the driver can « cut out the automatic action when he « has sighted the signal. Consequently « this braking is especially superior to « signal repetition alone and continuous « cab signalling alone, in the event of the « total incapacity of the engine crew.

« 29. Automatic braking depending on « the train speed is more valuable than « the former, especially in the case of « ultra-high speed trains; it is incontes- « tably of lower value when the engines « are equipped with cab signals. »

[621. 131.2 & 621. 133.5]

The specific steam consumption of superheated locomotives,

by Dr. A. LANGROD,
Member of the Technical Advisory Committee of the Polish Ministry of Transport.

Specific steam consumption is a factor hich it is essential to know, both when redetermining the power which locomoves are capable of developing and when esigning them to meet certain service onditions. At present, however, it is ot known with sufficient accuracy, hen considered with respect to the conitions which determine its value, for it serve as a sure basis for the calculions which arise during the construcon and operation of locomotives.

The various tests, so rich in useful reults, and carried out under varying contions on the locomotive testing plant of e Pennsylvania Railroad Co., are parcularly adapted for the purpose of makg clear what the relation is between ecific steam consumption and the many nditions which determine it. A study the results of these experiments has abled us to arrive at some laws of a neral character, lending themselves to preliminary calculations involved in omotive construction and operation.

We were in possession of the results trials on the locomotive testing plant, five simple expansion superheated lomotives, whose leading dimensions are en in the table below. The first four gines had superheaters with large tu, the fifth one with small tubes. A cial series of trials with locomotive . 2 in the course of which the Schmidt erheater was tried with different gths and arrangements of tubes, has been of the greatest use to us in our investigation. It is true that our object was not to find out the effect of these variations on the superheat; but as it followed that the temperature of the steam, all other conditions remaining of course the same, exhibited varying values, the results of these experiments (Report No. 24, Superheater Tests, 1914) permitted of the influence of the steam temperature on the specific steam consumption to be verified in a manner which would otherwise have been impossible. Among this series of experiments we have selected for more particular examination those carried out with the following arrangements of the superheater :

Arrangement of superheater.	*Superheating surface.*	
	m²	*sq. ft.*
Normal	91.9	*989*
3/4 length	70.2	*756*
1/2 length	48.0	*517*
1/4 length	25.7	*277*
Length nil	4.6	*49*
Above normal	98.4	*1059*
Simple steam pipe	47.9	*515*
Do. closed at one end	47.9	*515*

The diameter of the piston valve in these experiments was 12 inches (305 mm.), but in the principal experiments made with locomotive No. 2 it was 16 inches (406 mm.).

A circumstance acting favourably on

determining the influence of the superheat on the specific steam consumption was that locomotives Nos. 4 and 5 had similar driving mechanisms but diff rent superheaters, locomotive No. 5 ha ing higher superheat than No. 4.

Principal characteristics of the test locomotives (*)

Locomotive	1	2	3	4	5
Wheel arrangement	2-8-0	4-6-2	4-4-2	4-4-2	4-4-2
Number of cylinders	2	2	2	2	2
Diameter of cylinders (mm.)	635	610	597	559	559
Diameter of cylinders (*inches*)	(25)	(28)	(23 1/2)	(22)	(22)
Piston stroke (mm.)	711	660	660	660	660
Piston stroke (*inches*)	(28)	(26)	(26)	(26)	(26)
Diameter of driving wheels (mm.)	1 575	2 032	2 032	2 032	2 032
Diameter of driving wheels (*ft. in.*)	(5' 2")	(6' 8")	6' 8"	(6' 8")	(6' 8")
Boiler pressure (kgr/cm²)	14.4	14.4	14.4	14.4	14.4
Boiler pressure (*lb./sq.in*)	(215)	(215)	(215)	(215)	(215)
Grate area (m²)	5.14	4.99	5.18	5.13	5.1
Grate area (*sq. t.*)	(55.3)	(53.7)	(55.7)	(55.2)	(55.2
Heating surface in contact with fire (m²)	253.4	308.7	242.0	223.4	192.9
Heating surface in contact with fire (*sq. ft.*)	(2 727)	(3 323)	(2 600)	(2 404)	(2 076)
Superheating surface, in contact with fire (m²)	75.2	91.9	75.3	74.0	108.0
Superheating surface, in contact with fire (*sq. ft.*)	(809)	(882)	(810)	(797)	(1 162)
Weight in working order (metr. t.)	113	133	109	106	86
Weight in working order (*Engl. t.*)	(111.2)	(130.8)	(107.2)	(104.3)	(84.6
Adhesive weight (metr. t.)	99.7	81.6	60.4	64.0	57.2
Adhesive weight (*Engl. t.*)	(98.1)	(80.2)	(59.4)	(63.0)	(56.3

Values of factors used.

Using the notation hereafter :

S = hourly steam consumption in the engine, in kgr.;

σ = specific steam consumption, in kgr./I.H.P./hour;

v = speed in km. per hour;

n = revolutions per minute;

i = number of cylinders;

d = diameter of cylinders, in mm.;

s = piston stroke, in mm.;

D = diameter of driving wheels, mm.;

ε = actual cut-off, that is, the ra tion between the volume of the amo of steam admitted into the cylinders d ing one piston stroke and the cylin volume swept by such stroke;

p_i = mean indicated pressure, kgr./cm²;

p = pressure in the main steam p in absolute kgr./cm²;

t = temperature of the steam in main steam pipe, in degrees C.;

T = absolute steam temperature $t + 270$;

γ = specific weight of the steam kgr. per m³;

(*) The results of the experiments with locomotives Nos. 1, 2, 3 and 4 are taken from original reports of the *Pennsylvania Railroad Co.* (Bulletins Nos. 10, 18, 27, 21, and also 24, Superheater Tests); those relating to locomotive No. 5 (with small-tube superheater) from the book by R. GARBE : « Die Zeitgemässe Heissdampflokomotive (The modern superheated locomotive) (1924).

he well known corresponding equation s obtained, i. e. the equation resulting rom these definitions :

$$\sigma = 27 \frac{\gamma}{p_i} \varepsilon$$

n which

$$= 2000 \frac{D}{i\, d^2\, s\, \gamma\, v} = 10\,620\,000 \frac{S}{i\, d^2\, s\, \gamma\, n}.$$

For the pressures and temperatures net with in locomotive working, we have pproximately

$$\gamma = \frac{P}{0.00458\ T}.$$

Between the above limits the error in his formula hardly ever exceeds 2 % nd is generally much less.

Approximately, therefore, we get :

$$= 9.16 \frac{T}{p}, \frac{S\, D}{i\, d^2\, s\, v} = 48\,640 \frac{T}{p} \frac{S}{i\, d^2\, s\, n} \quad (1)$$

We shall use the value obtained from quation No. 1 as a reference value to ork with, differing in consequence but ttle from the effective admission. In ne case occupying our attention we have ery exactly

$$\sigma\, T = 5\,895 \frac{p}{p_i} \varepsilon \quad . \quad . \quad . \quad (2)$$

In this equation the influence is partly bservable of the steam temperature on ne specific steam consumption for a con- ant cut-off. Actually this influence is ill greater, whereas with a constant cut- ff p_i increases with the rise in the tem- erature.

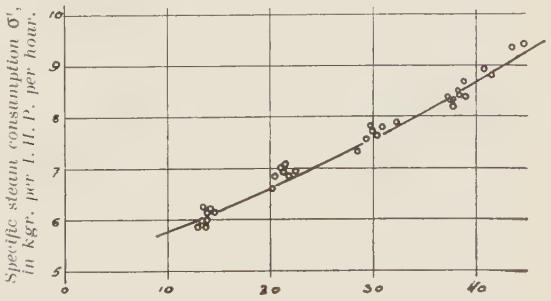
Owing to the form in which the steam mperature figures in equations 1 and 2 e shall use the absolute temperature as reference value which, as we shall see, ads to simpler equations.

Variation of the specific steam consumption with the steam temperature.

Figure 1, in which the actual cut-off appears as ordinates and the abscissæ represent the specific steam consumption, gives the results of the tests mentioned with locomotive No. 2 and different superheater arrangements. All the tests here considered were made at the same number of revolutions per minute,

Tests with locomotive No. 2. and various lengths and arrangements of superheater. Direct test results. Revolutions per minute $n = 240$.

Fig. 1.



Same tests as in fig. 1.

Specific steam consumption in relation to fixed steam temperature $T = 600°$ C (1112° F.) abs., $t = 327$ °C. (620.6° F.).

$$\sigma' = \sigma \left(\frac{T}{600}\right)^2 ; \quad \varepsilon' = \varepsilon \frac{T}{600}.$$

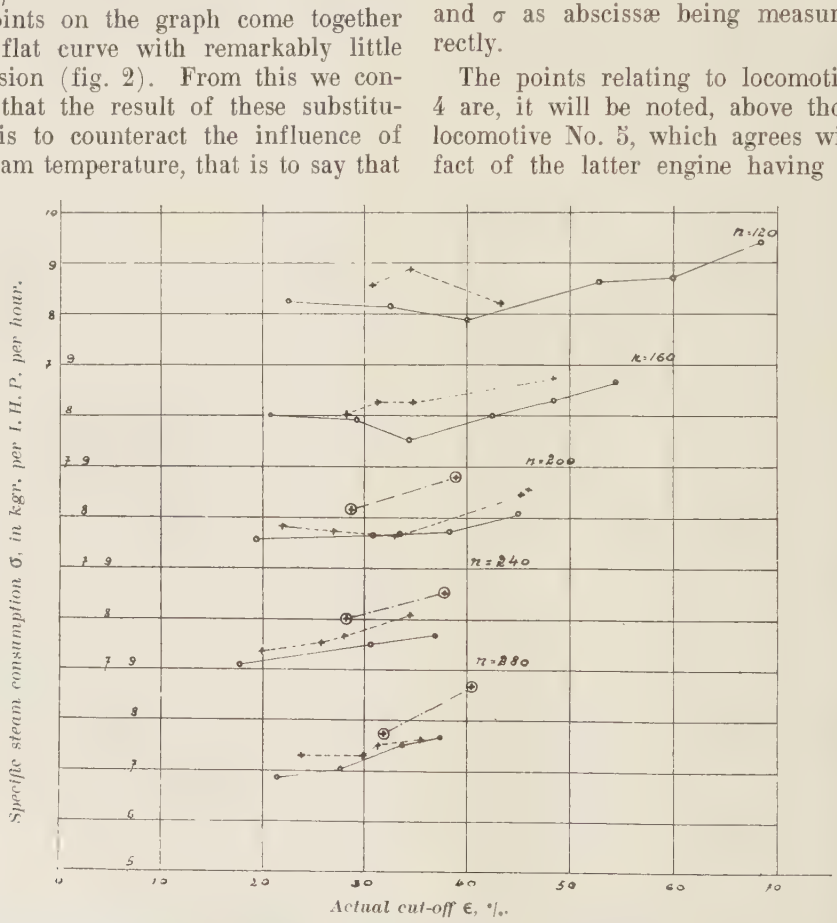
Fig. 2.

viz : $n = 240$. As, for the same admission and the same number of revolutions the steam temperature showed, according to the dimensions and type of superheater, very different values, the various points on the graph are seen to be widely dispersed.

But if we replace σ by the expression $\sigma\left(\frac{T}{600}\right)^2$ and ε by the expression $\varepsilon\frac{T}{600}$, the points on the graph come together on a flat curve with remarkably little dispersion (fig. 2). From this we conclude that the result of these substitutions is to counteract the influence of the steam temperature, that is to say that the points on the graph of the tests no correspond to a constant temperatur which is $T = 600°$ C.

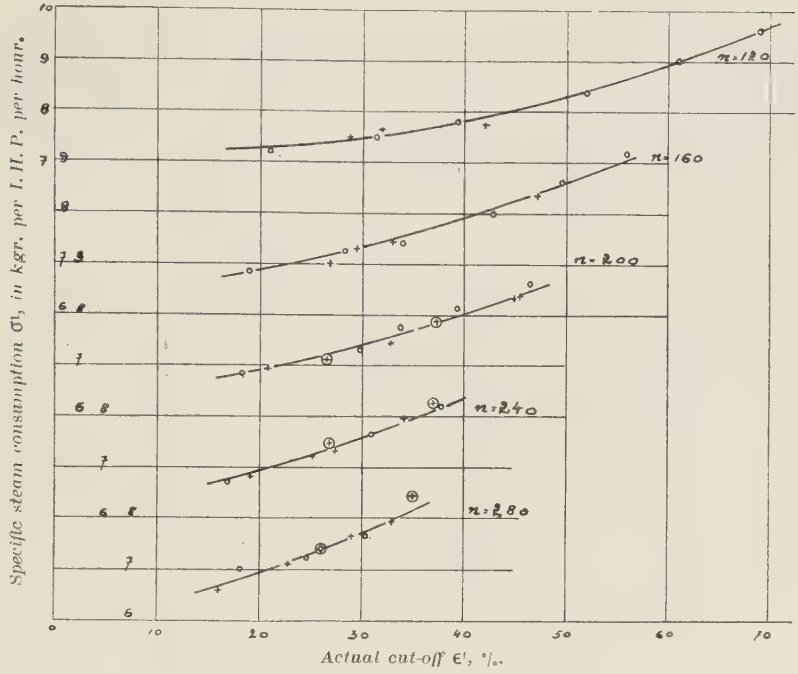
The fact that these substitutions reall establish the influence of steam tempe ature on steam consumption is also co firmed by the tests made with locomot ves Nos. 4 and 5. Figure 3 shows the r sults of these tests at varying numbe of revolutions per minute, ε as ordinat and σ as abscissæ being measured d rectly.

The points relating to locomotive N 4 are, it will be noted, above those fo locomotive No. 5, which agrees with t fact of the latter engine having highe



Tests with locomotives Nos. 4 and 5. Direct test results.
Tests with locomotive No. 4 . . . . . ⊥
» » » » with regulator partly closed . . ⊕
» » » No. 5 . . . . . ○

Fig. 3.



Same tests as in fig. 3.
Test results in relation to a constant steam temperature $T = 600°$ C. abs., $t = 327°$ C.

Fig. 4.

superheat. Further the values vary considerably, in accordance with the changing steam temperature.

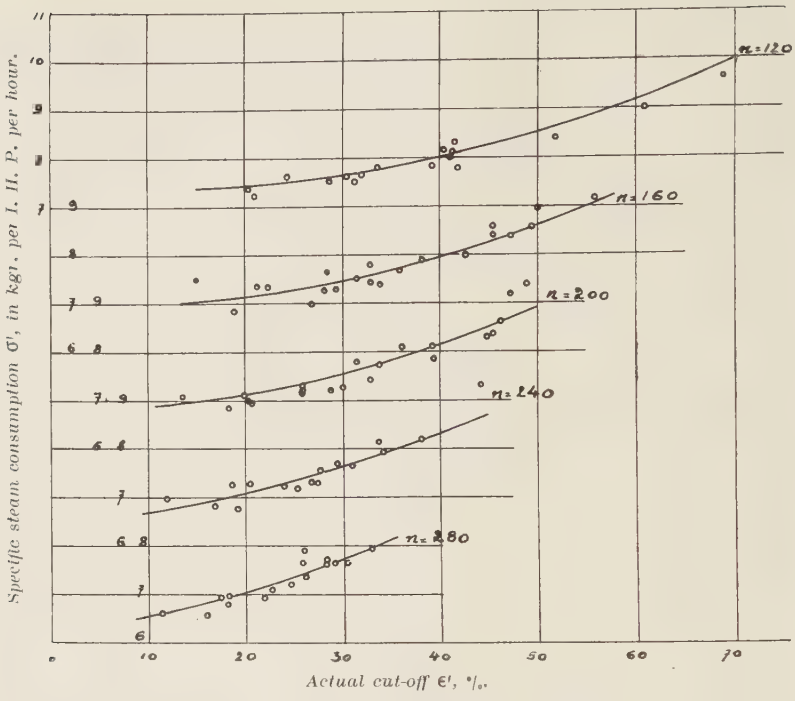
On the other hand, in figure 4, where $\varepsilon \frac{T}{600}$ is indicated horizontally and $\sigma\left(\frac{T}{600}\right)^2$ vertically, the difference between the points relating to the two engines disappears and they are found grouped together on flat curves, the steepness of which increases with the increase in the cut-off. From this we can conclude that the expressions $\varepsilon \frac{T}{600}$ and $\sigma\left(\frac{T}{600}\right)^2$ correspond to the actual, or effective, cut-off, and the specific steam consumption for a constant steam temperature of T = 600° C.

For the other locomotives the above-mentioned substitutions also produce a notable diminution in the dispersion of the points on the graph.

Variation of the specific steam consumption with the actual cut-off and the number of revolutions per minute.

Figure 5 gives the values of $\sigma\left(\frac{T}{600}\right)^2$ and $\varepsilon \frac{T}{600}$ at different revolutions per minute for the four express type locomotives (Nos. 2, 3, 4 and 5).

The curves show that the points representing the values obtained during the



Tests with express locomotives Nos. 2, 3, 4 and 5.
Test results in relation to a constant steam temperature $T = 600°$ *abs.*, $t = 327°$ *C.*

Fig. 5.

tests are grouped together on the same parabola, going from left to right and top to bottom in proportion as the number of revolutions increases. The following equation corresponds to these curves :

$$\sigma\left(\frac{T}{600}\right)^2 = a + 8\left(\varepsilon\frac{T}{600} - b\right)^2,$$

wherein

$$a = 8.5 - 0.92\,\frac{n}{100}$$

and

$$b = 0.35 - 0.19\,\frac{n}{100}.$$

From this we deduce that

$$\sigma = \frac{A}{T^2} + 8\left(\varepsilon - \frac{B}{T}\right)^2. \quad . \quad (3$$

wherein

$$A = 3\,060\,000 - 3\,300\,n$$

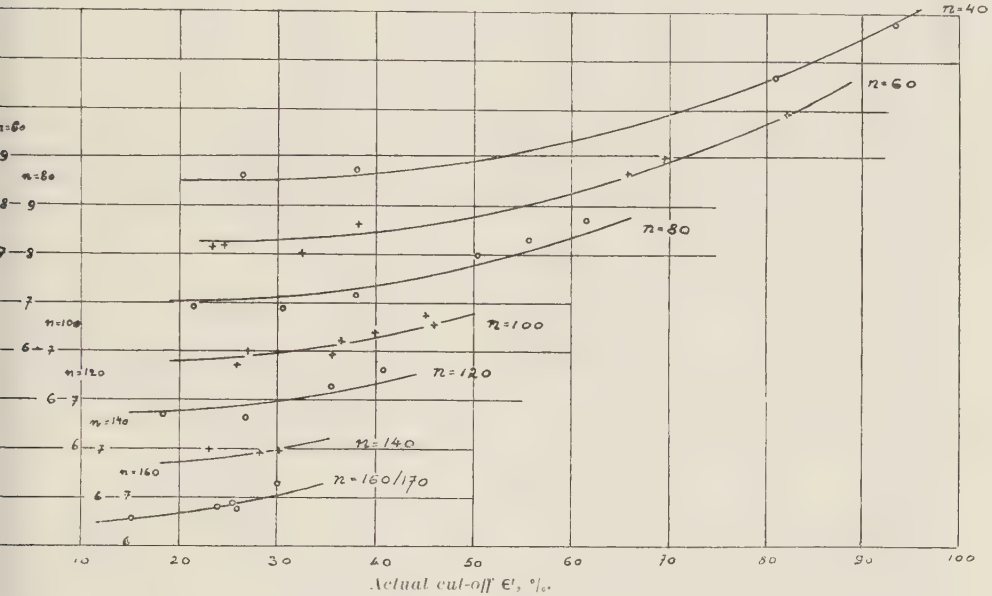
and

$$B = 210 - 1.14\,n.$$

Figure 6 is a similar diagram for th freight locomotive, the curves corres ponding to the same equations as for th express engines, but a little displace towards the bottom of the diagram Equation (3) is thus applicable to thi locomotive also, but with the differenc that A = 2 800 000-3 300n while B re mains practically invariable. Consequent

the specific steam consumption of the ight locomotive was, for the same tem- atures and revolutions, somewhat re favourable than for the express lo- notive. Of course, individual varia- ns will always be found.

cerning the influence of the steam pressure on the specific steam consumption at constant temperature and cut-off from the fact that increased boiler output is accompanied by a fall of pressure in the main steam pipe. Equation (2) shows



Test with freight locomotive No. 1.
Tests results in relation to a steam temperature $T = 600°$ abs., $t = 327°$ C.

Fig. 6.

With the express engines that were ed such variations were in fact ob- ved and contributed to the dispersion the points on the graph seen in fi- e 5. However, equation (3) may be d for preliminary calculations.

Variation of the specific steam consumption with the steam pressure.

ll the locomotives concerned in these eriments have the same boiler pres- e. No conclusion can be drawn con-

that such influence would be nil if, under such conditions, the mean indicated pressure rose proportionally to the pressure in the main steam pipe, which corresponds very nearly with reality.

To clear up this question it is desirable to make tests with wire-drawing the steam. Eight such tests were made on locomotive No. 4, the effect of which was to cause a considerable reduction of pressure in the main feed pipe. We give below, from among the results of these tests, those which are of interest to us.

R. p. m., n	*Indicated cut-off.*	*Actual cut-off*, ϵ.	*Effective pressure in main steam pipe*, $p - 1$		*Temperature in main steam pipe*, t		*Specific steam consumption* σ	
			kgr./cm²	(*lb./sq.in.*)	°C.	(°*F.*)	kgr./I.H.P./h.	(*lb./I.H.P./h*)
200	30	28.7	9.84	(*140*)	288.5	(*551*)	8.14	(*17.9*)
200	40	39.1	8.08	(*115*)	300.0	(*572*)	8.79	(*19.6*)
240	30	28.3	12.13	(*173*)	308.0	(*586*)	8.01	(*17.7*)
240	40	37.3	10.00	(*142*)	318.0	(*604*)	8.52	(*18.8*)
280	30	26.8	11.43	(*162*)	316.0	(*600*)	7.67	(*16.9*)
280	40	35.5	8.93	(*127*)	320.5	(*609*)	8.67	(*19.0*)

The values of σ and ε obtained in these tests are seen marked with a ring in figure 3 and are, it will be noted, above those corresponding to the tests without wire-drawing, which proves before everything that wire-drawing causes the steam temperature to fall. If this were the sole reason for the increase in specific steam consumption, that is if the reduction in pressure, temperature and cut-off remaining constant, had no effect on the specific steam consumption, the points on the graph due to wire-drawing experiments, determined by the substitutions given above, ought to appear on the same curves as those obtained in similar manner during the trials made without any wire-drawing effect. Figure 4 shows that this is actually the case. It may certainly be admitted that the favourable influence on the specific steam consumption of an increase in the pressure only appears in the fact that, for the same hourly steam consumption S and the same steam temperature T, the actual cut-off, and consequently the specific consumption also, become less. From this it follows that equation (3) can also be employed for different steam pressures.

Limits of cut-off and speed.

Strictly speaking the actual cut-off can exceed unity, seeing that the steam a mitted to the cylinders serves also to f the clearance spaces. In reality, howev such a condition will no doubt never met with and $\varepsilon = 1$ can be regarded a maximum admission. If we indic the number of revolutions at full adm sion by ν or the corresponding speed φ, calling them the full-admission rev utions and full-admission speed respe ively, we find that

$$\nu = \varepsilon n = 48\,640 \frac{T}{p} \cdot \frac{S}{i d^2 s} \quad .$$

and that

$$\varphi = \varepsilon v = 9.46 \frac{T}{p} \cdot \frac{S D}{i d^2 s} \quad .$$

The value of full-admission re utions, or full-admission speed, fo for maximum continuous boiler outp is a characteristic of the particular comotive concerned. By dividing by n or v the effective cut-off cor ponding to the continuous boiler put, the revolutions, or the speed question, can all be obtained.

The second limiting quantity is erned by the minimum normal adm sion with regulator fully open. We call this admission the limiting w drawing admission, ε_d, and call the responding number of revolutions

peed n_d revolutions, or v_d speed, like-ise at wire-drawing limit.

We may take, as practically corres-onding to normal conditions

$$\varepsilon_d = \frac{3}{p} \quad . \quad . \quad . \quad . \quad (6)$$

Then we have

$p = 12$ $\varepsilon_d = 0.25$
» $= 14$ » $= 0.215$
» $= 16$ » $= 0.187$
» $= 18$ » $= 0.167$
» $= 20$ » $= 0.15$.

From equation (6) we get :

$$n_d = \frac{\nu}{3} p \quad . \quad . \quad . \quad (7)$$

nd

$$v_d = \frac{\varphi}{3} p \quad . \quad . \quad . \quad (8)$$

When designing a locomotive the ser-ce condition stipulated is generally the nount of work which the engine must erform without throttling at the regul-or, at maximum boiler output. In her words what is given is the maxi-um continuous tractive effort which n be developed continuously at maxi-um speed without throttling at the re-ulator.

It is recommendable to employ the peed at the throttling limit and the umber of revolutions at full admission locomotive characteristics. The first rectly indicates the type of locomotive id the second is an auxiliary value, the gnificance of which we will explain by example. The two are related by the uation

$$\nu = \frac{v_d}{D\,p} 16\,000 \quad . \quad . \quad . \quad (9)$$

* * *

Example.

Suppose we are considering a design for a locomotive developing with maximum throttling, at a speed $v_d = 75$ km. p.h., an indicated tractive effort $Z_i = 7\,000$ kgr. The effective boiler pressure is taken as 15 kgr. per cm², and the steam temperature 327° C. ($T = 600°$ C.).

The driving wheel diameter is 1 850 mm. We will take the drop in pressure up to the feed pipe to equal 1 kgr. per cm² so that the absolute steam pressure therein $p = 15$ kgr. per cm².

According to equation (9) we have

$$\nu = \frac{75}{1\,850 \times 15} 16\,000 = 43\,2.$$

At a speed $v_d = 75$ the corresponding number of revolutions will be :

$$n_d = 5\,310 \frac{v_d}{D} = 215.3$$

and therefore :

$$\varepsilon_d = \frac{43.2}{215.3} = 0.2.$$

For this number of revolutions equation (3) gives us :

$$A = 2\,359\,510 \text{ and } B = -35.4 ;$$

consequently

$$\sigma = \frac{2\,359\,510}{360\,000} + 8\left(0.2 + \frac{35.4}{600}\right)^2 = 7.1.$$

The indicated tractive effort is given by the following known equation :

$$Z_i = 270 \frac{S}{\sigma v}.$$

Whence

$$S = \frac{Z_i v}{270} = \frac{7\,000 \times 75 \times 7\,1}{270} = 13\,800 \text{ kgr./hour.}$$

The locomotive must therefore be given a boiler capable of producing continuously 13 800 kgr. of steam per hour.

From equation (4) we get :

$$i\,d^2\,s = 48\,640\,\frac{T}{p}\,\frac{S}{v} = \frac{48\,640 \times 600 \times 13\,800}{15 \times 43.2} = 621\,510\,000.$$

Assuming $i = 2$, and $s = 700$ mm., this gives, from the above equation :

$$d = 666 \text{ mm.}$$

For different speeds, the specific steam consumption, the indicated tractive effort and the indicated horsepower of this locomotive will therefore have the following values :

v		n	ϵ	σ		Z_i		N_i
km./h.	(*m.p.h.*)			kgr./I.H.P./h.	(*lb./I.H.P./h.*)	kgr.	(*lb.*)	
15	(*9.3*)	43.2	1.0	12.27	(*27.05*)	20 250	(*44 640*)	1 125
20	(*12.4*)	57.4	0.753	10.07	(*23.59*)	18 500	(*40 785*)	1 370
30	(*18.6*)	86.1	0.502	8.51	(*18.76*)	14 850	(*32 735*)	1 620
40	(*24.9*)	114.8	0.376	7.92	(*17.46*)	11 750	(*25 900*)	1 740
50	(*31.0*)	143.5	0.301	7.58	(*16.71*)	9 820	(*21 650*)	1 820
60	(*37.3*)	172.2	0.251	7.34	(*16.18*)	8 530	(*18 800*)	1 880
70	(*43.5*)	200.9	0.215	7.14	(*15.74*)	7 440	(*16 400*)	1 930
75	(*46.6*)	215.3	0.200	7.10	(*15 65*)	7 000	(*15 430*)	1 940

RECAPITULATION.

The factors determining the specific steam consumption can be placed under three headings :

1. The condition of the steam before its introduction into the cylinders, characterised by the temperature and pressure of the steam in the main steam pipe.

2. The work the locomotive is capable of doing. For any given locomotive this is determined by the number of revolutions and the amount of steam introduced per hour into the cylinders.

3. The dimensions and constructional ratios of the locomotive and its valve gear.

The steam consumption thus depend on a considerable number of factors; i this investigation we have, with the ai of the results obtained in American tes ing stations, arrived at the following co clusions :

1. Trials made with a locomotive, t superheater of which was modifie many times, and those made with tv other engines which had the same mec anism but different boilers and s perheaters, have shown that it is poss ble, with the aid of two correlative valu σ and ε, obtained from the tests a applicable to the steam temperature to calculate two others, σ_1 and ε_1, appl able to another temperature T_1, wh postulating that

$$\sigma_1 = \sigma \left(\frac{T}{T_1} \right)^2 \quad \text{and} \quad \varepsilon_1 = \varepsilon \frac{T}{T_1}.$$

In these formulæ it is a question of bsolute temperatures ($T = t + 273$); nd the effective cut-off, (or more xactly the value of the reference factor, vhich differs little therefrom) is calulated from the equation

$$\varepsilon = 48\,640 \frac{T}{p} \frac{S}{i\,d^2\,s\,n}.$$

In English units (inches, pounds, ounds per sq. inch, degrees Fahrenheit, ounds per H.P./hour) we have :

$$T = (t + 460),$$

nd

$$\varepsilon = 10.64 \frac{t + 460}{p} \frac{S}{i\,d^2\,s\,n}.$$

Thanks to these substitutions the reults of experiments carried out at a vaiable, and at times, uncertain steam emperature can be reduced to a contant one, the effect of which is to elimnate the effect of steam temperature nd bring out more clearly the influence f other factors determining the specific team consumption. These substitutions re to be used also when comparing the nechanisms of different locomotives rom the point of view of specific steam onsumption, for they eliminate, should be required, from the test results the nfluence on such consumption of the ifferent superheaters the engines may e equipped with.

2. By means of steam throttling tests, n which the steam pressure underwent urge modifications, it was found that naking use of the substitutions above nentioned, the effect of steam pressure n the specific consumption was already aken care of by the introduction of the ctual cut-off as a reference value.

3. Theoretically, when using the actual cut-off as the reference value, the hourly steam consumption and the volume swept by the piston are also taken into account.

4. Referred to a constant steam temperature, the results of the tests of all locomotives whose working was investigated show that an equation of a parabola, the axis of which is parallel to the direction in which the specific steam consumption is measured, corresponds to the relation between that consumption and the actual cut-off.

5. All these tests show that on a graph where the actual cut-off is shown vertically and the specific steam consumption horizontally, the above-mentioned parabola comes lower down and more to the left, without altering its form, as the number of revolutions increases. From this it can be concluded that at constant steam temperature and increasing number of revolutions the specific steam consumption decreases with early cut-offs and increases with late ones.

6. These conclusions being admitted, the specific consumption is given by

$$\sigma = \frac{A}{T^2} + C \left(\varepsilon - \frac{B}{T} \right)^2$$

wherein the co-efficients A and B diminish in an approximately linear ratio when the number of revolutions increases, while the factor C remains constant.

7. A and B vary more or less from one engine to another, while C has a value practically equal for all of them. These differences indicate the individual characteristic of each locomotive, which is related to constructional features, such as the cross-section of steam passages, capacity of clearance spaces, the way the valve gear works, etc. The

experimental data available are insufficient to determine numerically the effect of all these factors on the specific steam consumption : special tests are required to do this.

8. In preliminary calculations it is advisable to give to coefficients A, B, and C average values leading neither to an over-estimate nor an under-estimate of the specific steam consumption. It will be found suitable provisionally to select the following values :

For metric weights and measures, and degrees C :

$A = 3\,060\,000 - 3\,300\ n$, $B = 210 - 1.14\ n$, $C = 8$, wherein $T = t + 270$.

For English weights and measures, and degrees F :

$A = 22\,160\,000 - 23\,900\ n$, $B = 378 - 2.05\ n$, $C = 17.9$, wherein $T = t + 460$.

9. The condition of the steam in the live steam pipe varies with the boiler output. But the most important point is to determine the tractive effort characte ristic, that is to say the relation betwee the tractive effort and the speed corres ponding to the maximum continuou boiler output and consequently to a give condition of the steam in the live stea pipe. If the latter condition is know from the trials made with a given engine or if it can be deduced from those mad with others, the specific steam consump tion can be calculated, with the aid o the approximate formula given above for an amount of work corresponding t this tractive effort characteristic. If how ever, other scales of work developed hav to be taken account of, it becomes neces sary to know the ratio of the steam tem perature and pressure on the one han to the boiler output on the other. To de termine this requires a special investig ation.

10. In consequence, the above investig ation by no means covers the whole pro blem of specific steam consumption i superheated simple expansion locomoti ves; it is merely a modest contributio towards its solution.

Comparative study of road motor transport regulations,

*(6th article *),*

by VLADIMIR IBL,
Engineer, Manager, Operating Department, Czechoslovakian State Railways.

Since the fourth article in this series was ublished, giving the third supplementary ıumeration of the legal and administrative cts on road motor transport, important easures have been taken in various coun- ies, particularly as regards lorries, whether rivately owned or belonging to transport rms. It is therefore necessary to include the present article a further enumeration complete the former. It is also necessary make certain amendments to the different apters previously published, particularly supplement to the Third Chapter which ppeared in the fourth article of this series . 918, 1936) about the first attempts to gulate private transport of goods by road. As the Hellenic State Railways recently ined the First Regional Group of Railways longing to the U. I. C. (G. R. E. M.) and wards the end of 1936, Greece began to re- ılate road motor transport, this country ust now be included in the Supplement hich is the object of this article, as well in the amendements and additions to the evious Chapters.

(*) The five previous articles of the pre- nt study appeared in the following numbers this Bulletin :
(1) May 1935, pp. 544 to 556; — (2) Fe- uary 1936, pp. 130 to 149; — (3) June 36, pp. 582 to 597; — (4) September 1936, . 916 to 930; — (5) October 1936, pp. 1050 1066.
In the present article, the numbers in brack- refer to the pages of the previous articles d the year of publication.

1. Enumeration of the legal and administrative enactments regulating road motor transport in the different European countries (**).

(Fourth supplement.)

Germany.

Addition to point 1.

Point 1 (p. 544/1936) must be completed as follows :

The law of the 26th June 1935, *relating to professional long-distance motor transport of goods* — as was stated on page 132 (1936) — came into force on the 1st April 1936, at the same time as the *order of the 27th March 1936*, regulating its application.

This regulation of professional transport by lorry was completed by several further decrees, as well as by a series of orders and circulars issued by the Minister of Communications, and published in the *Official Journal* of the Ministry of Communications.

As far as legal provisions to complete the two acts mentioned above are concerned, mention must first of all be made of the *decree of the 17th September, 1936, on the transport of furniture* (apart from furniture for sale) which came

(**) Amendments up to the 1st July 1937.

into force on the 1st October 1936, the application of which was the object of an order of the Minister of Communications dated the 7th October 1936, as well as two circulars of the 24th May 1936. Another *decree of the 9th November 1936 regulates the working conditions for long-distance lorry transport firms.* The taxes for the administrative acts to which such carriers are liable form the subject of the decree of the 28th December 1936.

The *administrative* application of the law of the 26th June 1935 and the decree of the 27th March 1936, which is the object of the above-mentioned orders and circulars published in 1936 and 1937 in the *Official Journal,* is given in paragraphs 1, 2, 8, 9, 10, 13, 19, 34, 35, 36, 37 and 39 of the law, and paragraphs 4, 6, 9, 20, 39, 41, 42, 43, 45 and 46 of the decree. Most of these clauses also expound certain provisions in the two legal instruments.

As for the *law of the 4th December 1934* (p. 544/1936) *regulating commercial passenger motor transport,* which has been in force since the 1st April 1935 at the same time as *the application order* of the 26th March 1935 (pages 132/1936 and 916/1936), the *Official Journal* for 1935 and 1936 and the first half of 1937 contains a fair number of circulars dealing with details thereof and the necessary explanations.

Addition to point 2.

Point 2 (p. 544/1935) should be completed as follows :

The *special law of the 27th June 1933* on the making of state motor roads has been replaced by a *new law of the 18th December 1933* and this latter was amended in turn by the *law of the 14th May 1936.*

Addition to point 3.

Point 3 (p. 544/1935) must be co pleted as follows :

The *Official Journal* of the Minist of Communications for 1935 and 19 as well as the first half of 1937 contai many *administrative circulars* deali with the application of the *legal pro sions on the safe running of road mot vehicles, the Highway Code,* etc., me tioned on page 544 (1935).

Addition to point 4.

Point 4 (p. 132/1936) must be co pleted as follows :

The *Minister of Finance's circular* the 3rd November 1936 relates to the a plication and explanation of the law *transport taxes on motor vehicles.*

As regards the fiscal charges, an i portant step was taken by the *law of 2nd July 1936 which extended the tax transport to commercial passenger tra port and to all lorry transport, whet commercial or private,* completed by *application decree of the 21st Septem 1936.* The clauses relating to the n tax came into force, in the case of p senger transport, on the 1st March 19 and in the case of goods transport on 1st October 1936. The *Official Jour* in its No. 24 of 1936 gives the reas for introducing this new tax. (We w return to this point later on.)

Austria.

Addition to point 4 (p. 582/1936).

Decree No. 253 of the 9th June 1 on goods transport by road was exte ed after the 30th June 1936 until 30th September 1936. Soon after it pired (27th November 1936) it was o

ore enforced, without any alteration, ntil the 31st July 1937. Negociations ith those concerned, begun in Decemer 1936, having come to nothing during is time, on the 23rd June 1937 the Goernment decided to extend it once more ntil 31st July 1938, but with a few moifications relating to professional transort, relaxing to some extent the regulions on the minimum rates. No basic terations were made in the case of priate transport. These changes were the bject of the *law of the 28th July 1937.*

Belgium.

Addition to point 1 (p. 546/1935).

The *law of the 21st March 1932 regulting public omnibus and motor car serices* was completed and modified by the *oyal Decree of the 31st March 1936* in rder to extend to private transport of eople by motor car the obligations imosed on those operating public motorus and motor char-a-banc services, ther as regards safety regulations, and surance of civil liability, or in the inrests of national defence, or again for atistical or control purposes.

Addition to point 3 (p. 546/1935).

The *Royal Decree of the 7th April 1936* mpleted and modified the *Royal Dee of the 12th July 1933 (general regulions applying to public motorbus and otor char-a-banc services),* notably in der to make it possible to use for other rposes the vehicles licensed for motorus service, to regulate the simultaneous nsport of passengers and goods in vecles licensed for motor char-a-banc serces, and finally to regulate for such blic services the use of vehicles conting of a tractor and trailer.

Another *royal decree, dated the 7th 36,* regulates, particularly from the point of view of safety, the *transport in common* of passengers, other than in public motorbus and motor char-a-banc services, *worked by means of coaches built to carry more than six persons* (in addition to the driver).

These regulations are an addition to the general regulations mentioned above for motorbuses and motor char-a-bancs. It is stated therein that similar regulations will eventually be applied to vehicles carrying six persons or less (ordinary hackney cars). These new regulations have not yet been passed, however.

A new point 5 must be added which replaces the last paragraph of point 4 (page 547/1935) and is worded as follows :

« According to the bill of law put before the Houses in March 1934, the regulation of lorry transport only came into force in 1936.

The *law of the 5th March 1936* regulating the transport of goods in motor vehicles, followed by the *Royal Decree of the 9th May 1936,* and which lays down the general regulations on goods transport in motor vehicles (both of which came into force on the 8th June 1936) only deal with transport carried out on behalf of a third party against payment (i.e. professional transport) which, generally speaking, has to be licensed. Transport worked by vehicles hired out for a longer period also come under these regulations. On the contrary, goods transport worked on behalf of a person (or firm) to carry, in vehicles owned by the person (or firm), goods owned by him or used in connection with his business, trade or work, do not have to obtain a licence of any kind. »

As regards private goods transport, which according to the findings of the

Commission set up by the Higher Transport Council in 1932 should be regulated by means of taxes, the Government has not altered its point of view, and complete liberty is allowed in the case of such transport.

France.

Addition to point 1 (pages 547/1935, 133/1936, 582/1936 and 917/1936).

The composition of the *Higher Transport Co-ordination Committee* (instituted by the *decree of the 9th July 1935),* which had already been altered by the *decree of the 5th October 1935* (p. 917/1936) was further modified by the *decree of the 28th November 1935.*

The *order* of the Minister of Public Works dated the 26th February 1936, based on the law of the 19th April, 1934, and those of the 25th February and 13th July 1935, regulating the public administration of the former decree, set up an *Investigation Commission to examine the transport proposals submitted to the Minister by the Road and Rail Transport Co-ordination Committee.*

The *decree of the 14th November 1936* regulating the public administration of the law of the 19th April 1934, makes a further change in the *composition of the Co-ordination Committee* and lays down the composition of the *Departmental Technical Transport Committees.*

Two *circulars issued by the Minister of Public Works* on the 12th August and 23rd November 1936, deal with the practical application of co-ordination measures, especially as concerns the closing down of certain railway lines and their replacement by road motor services.

However, according to the law of the 8th July 1937 laying down a set of measures intended to straighten out the financial position (see below), the v rious organisations for investigating applying co-ordination measures are n for the most part absorbed into t *Higher Transport Council* set up by t Minister of Public Works under hea ing III of the *decree of the 31st Aug 1937,* which also deals with the co-ordi ation of transport in general (see belo

Amongst other things, this new Cou cil has taken over the duties and pre gatives of the *Road and Rail Transp Co-ordination Committee* instituted the law of the 19th April 1934 (see 547/1935) and of the *Higher Transp Co-ordination Committee* instituted the decree of the 9th July 1935 (above).

Some of the duties and prerogatives the Higher Transport Council can be signed to Permanent Committees wh will be instituted for this purpose by cree of the Minister of Public Wo and if need be the other Ministers c cerned. But it has already been deci that a *Permanent Committee for the ordination of rail and road trans* will be set up within the Higher Tra port Council as regards the duties prerogatives implied in heading I of degree of the 31st August 1937, in c nection with the co-ordination of pu passenger and goods transport.

The decree also authorises the Mi ter of Public Works to hand over examination, investigation or contro certain business, to a General Perma Commission.

The objects in view when creating Higher Transport Council is given in preamble explaining the decree as ows :

The creation of the Higher Trans Council is due to a desire to make it sible to lessen the financial charges thr

unity of conception and the perfecting of a coherent policy as regards transport.

The Higher Transport Council will form a permanent body, closely linked up with the Administration, side by side with the Government, which it will support with its opinion and counsel. In conjunction with the Minister of Public works, and taking the place of the present co-ordination organisations, its duty will be to collect the work done by the councils already formed and the many co-ordination committees, and replace the unduly limited scope of each of these by a widespread desire for adaptation and progress, so that, rising above personal technics, it may restore to the idea of transport the character of economical servant of the general interests of the country, which it should never have lost.

Clause 39 of the decree defines as follows the general prerogatives of the Council :

The Higher Transport Council is charged with :

the drawing up of programmes for setting up or abandoning public transport services;

programmes for bringing together or making agreements between various ways of communication;

programmes of works and stock in so far as these can change the relative position of the different methods of transport;

general police, safety and insurance regulations;

tariff questions, particularly those likely to affect the relative position of the different methods of transport;

questions of efficiency of the various methods of transport and their use, notably by the public services;

co-ordination of the different methods of transport.

The Higher Transport Council also has to advise on questions put before it by the Ministers concerned. It can, in particular, be consulted on questions relating to collective agreements, working regulations, wage questions, and pension schemes for retired transport workers.

* * *

As for the measures intended to *co-ordinate* transport, we shall see later on (see *Addition to point 3)* that the decree of the 8th July 1937 deals with the question by imposing taxes on public road motor transport.

Now, a new *decree*, dated *the 31st August 1937*, dealing with the co-ordination of transport (apart from the creation of the Higher Transport Council mentioned above) has for its object to complete in the interests of a coherent transport policy and to ensure the success of the recent reorganisation of the railways (proclaimed by another decree also dated the 31st August 1937); the first part is devoted to the co-ordination of public passenger and goods motor transport.

This new decree modified the clauses of the following decrees on the co-ordination of railway and road transport :

decree of the 19th April 1934 (see page 547/1935), the basic instrument for this co-ordination;

decree of the 10th July 1935 (see page 582/1936), on which the decree of the 13th July 1935 (see page 134/1936) regulating professional motor goods transport was based;

decree of the 30th October 1935.

Mention of the decree of the 30th October 1935 may give rise to confusion, seeing that there are two decrees of this date; one relating to infringements of the regulations on co-ordination of transport (see page 582/1936), and the other introducing licences for private goods transport (page 132/38).

However, the decree of the 31st August 1937 only affects public transport and does not concern private transport, so that it would appear that it is the former decree relating to the above-mentioned infringements that is meant here.

This slightly modifies the decree of the 8th July 1937 (see below) in favour of those operating occasional passenger services, as regards the procedure in connection with the payment of the taxes imposed by this decree, and also as regards the application of the taxes on public goods transport, and especially their discrimination according to distances.

The grounds on which the decree of the 31st August 1937 is based are stated to be :

(*a*) To realise efficacious co-ordination of public passenger transport under the following conditions :

1. That the Departments and authorities granting concessions for subsidised public transport services be directly interested in their co-ordination under local conditions;

2. That the funds made available to the Departments by the law of the 8th July 1937 and the public administrative regulations of the 16th July 1937 be used for the reorganisation of the departmental transport services and the conversion of duplicate services;

3. That collaboration be entered into with the railway in order to organise road motor services to replace railway services.

This essentially implies collaboration with the General Councils. The latter will in future be charged with the drawing up of the departmental programmes for co-ordination of passenger transport, in collaboration with the technical committees.

(*b*) Co-ordination of goods transport implies, in turn, the perfecting of formulæ taking the distances worked into account.

Great freedom is permitted in the case of small and large transport undertakings working over short distances within a sma area, which consequently do not compe against the railway. In particular, rur lorry transport undertakings will be le unrestricted.

In the case of long-distance transport, the apportioning of the stock quotas covered by the present legislation, the mo effective measure would appear to be prevent the tariff war at present waged b tween the different methods of transpo which involves the railway in serious loss of receipts.

It will be possible to limit such compet tion if the road firms are grouped into ass ciations applying identical and controll rates which can be controlled by the Sta and the co-ordination committees.

After the publication of this decree n new road service can be set up witho the authorisation of the Minister of P blic Works, given after seeking th advice of the departmental technic transport committee.

All supplementary measures intende to assure the co-ordination of railwa and road transport will be taken by d cree.

Within three months of the publi ation of the decree, i.e. before the 1 December 1937, the different laws on th co-ordination of railway and road tran port will be codified in a decree sign by both the Minister of Public Wor and the Minister of Finance.

Finally, mention must be made of t fact that the application of clauses and 49 of the *decree of the 13th Ju 1935* on public road goods transport a made the subject of a decree of the *M nister of Labour*, dated the *3rd Dece ber 1935*, and laying down the conditio under which insurance companies w receive approval.

Addition to point 2 (page 547/193

In order to reduce the cost to the Sta

construction and maintenance of the oads and bridges, the *decree of the 30th ıne 1934* laid down certain regulations ı the running of vehicles on the public oads. This decree was modified by the *ecree of the 30th October 1935* on the eight and length of so called articul- ed vehicles (i.e. consisting of a tractor ıd a trailer).

Some of the provisions, in the above o decrees, on the *weight of vehicles* ingle units, articulated vehicles or with ecial engines) *authorised to run on the ad* were altered by decree of the 28th ay 1936, of the Minister of Public orks.

The *decree of the 31st December 1922* ntaining the general regulations on ad traffic was altered once more (it d already been altered by several pre- ous decrees) by that of the *1st Octo- r 1935*. In addition, *a regulating or- r* was issued on the 10th February 36, *specially* laying down *the condi- ns with which motor vehicles used ovisionally or temporarily for a public ssenger transport service* must comply. The order of the Minister of Public orks dated the *26th November 1935* re- lated the way the *distinctive marks on hicles for public passenger transport re* to be displayed.

Addition to point 3 (page 134/1936).

The law of the 30th June 1937 gave Government certain powers in order bring about a financial recovery in cordance with the object of this law, ecially in order to get a just and pro- distribution of the charges on rail- y and road transport in view of the neral increase in railway rates intro- ed by the above-mentioned law; part of the *decree of the 8th July 1937*, ich includes the application regul- ations is devoted to the co-ordination of such transport. This part of the decree imposes a special annual tax on *vehicles* used for public *goods transport*, based on the *weight of the lorry* in working order, and on vehicles used for public *passen- ger* transport, based on the *number of seats*. In explaining the object of this decree, the fact is stressed that these fiscal measures do not affect the final co-ordination policy dealt with in the law of the 30th October 1935, in con- nection with private goods transport, and the decree itself states that these measu- res have been introduced until such time as the co-ordination measures will have been applied throughout the country.

The same part of the decree increases the tax on motor fuels.

Addition to point 4 (page 582/1936).

Clause 8 of the *law of the 30th Octo- ber 1935* imposing taxes on certain pri- vate motor transport of goods laid down that the fixing of the conditions and sup- plementary application measures of the said law, especially as regards the total amount, the conditions and the way the said tax shall be paid, as well as the date it shall come into force, will be co- vered by public administrative regul- ations.

The *decree of the 16th July 1937* fi- nally fixed these taxes, as from the 18th September 1937, in the form of *annual taxes differentiated according to the weight of the lorry in working order*, trailers being counted together with their tractors.

Greece.

Public road transport of passengers and goods is regulated by the *law of the 30th December 1936* on the operation of suburban road services by mechanical

traction. The law covers transport worked between two places more than 20 km. (12.4 miles) apart in the case of motor-bus services, and more than 50 km. (31 miles) apart in the case of lorry services. It also includes certain technical clauses (dimensions and maximum weight of lorries) and others affecting the staff of road carriers.

Switzerland.

Addition to point 5 (p. 136/1936).

The rejection (in May 1935) of the bill of law on the apportionment of goods transport was due to a majority holding conflicting views. One party feared the adoption of the bill would be detrimental to freedom of trade and industry, while the other party found it inadequate as a means of efficaciously protecting the railway. Immediately afterwards, the Post and Railway Department took steps to solve the problem by entering into negociations with the parties concerned. As it considered that to do this it was necessary to know the nature and volume of the traffic carried by lorry, the Federal Council drew up a *federal decree,* approved by the Houses on the 24th April 1936 and *coming into force on the 15th June 1936,* instituting *statistical returns of road goods transport carried out by motor vehicles.* In the *application order* of the 29th May 1936, the Federal Council laid down the procedure for drawing up such statistics, and in particular determined and defined the categories of persons and firms obliged to make transport returns. In March 1936, a *Note by the Swiss Motor Lorry Owners Association* urgently calling for new legislation to regulate the chaotic state of affairs in the transport industry, led the Swiss Post and Railway Department to draw up in Septem 1936, a scheme for a federal decree the general regulation of road mo transport of passenger and goods (m ing provision for a policy of concessi and imposing a federal tax on tra port), and this was the subject of a blic enquiry. The observations and s gestions put forward enabled the said partment to push a second scheme da the 12th February 1937. This led many recommendations being put f ward, which led the Department to vise the original text to meet the wis of the authorities and professional a ciations concerned.

The result is the proposed *federal cree on the transport of passengers goods* put before the Federal Assem by the memorandum of the *18th J 1937.* This proposal, avoiding all fi matters, is limited to clauses on con sions for professional transport. As gards private goods transport, this not require a concession, but those w ing such transport are required to re ter. As regards the rates applicabl professional transport, the proposa that the Federal Council shall lay d the general principles and issue presc tions for their approval and publicat

It is difficult to foresee the future this proposal, and when it will poss be passed.

Czechoslovakia.

Addition to point 1 (page 136/19

Occasional professional goods trans is not in general restricted as regard stance except by *law No. 77 of the April 1935,* which took over from previous law (No. 198 of the 23rd cember 1932) the clause stipulating such transport can only be authorised a definite district. The applicatio

is clause, interpreted in a very wide nse by road transport firms and other onomic circles, was the subject of ngthy negociations between the Minis- ies concerned. As a result thereof, the *inistry of Trade and Industry* publish- on the 24th June 1933 *administrative ders* giving the authorities competent grant concessions guidance on the sub- ct of the extent and delimitation of the strict covered by the concession. An ac- unt of these guiding principles was giv- in the June 1934 number of the « Inter- ational Railway Transport Bulletin» pu- ished by the Central Office at Berne. ccording to these guiding principles, e extent of the district for which a ncession can be granted is inversely roportional to the tonnage of the lorries ed. At the present time the concession as already been obtained for four fifths the lorries used in professional trans- rt or else their owners have applied r a concession as prescribed.

Decree No. 165 of the 12th June 1936 troduced certain fiscal advantages, and gulated the sale of motor fuels on holi- ays, thereby amending and completing w No. 77 of the 12th April 1935.

One of the above-mentioned advanta- es was the extension until the 31st July 937 of the time within which, according the law of the 12th April 1935, the vners of average and heavy lorries used r their own business requirements had produce evidence of an agreement with e railway if such lorries were not to come liable to a fairly heavy supple- entary tax, increasing with the tonnage the lorry (see page 921/1936).

Another important advantage introduced this decree concerns the minimum stance after which these supplementa- taxes are payable (see page 923/1936).

A new *decree, No. 124 of the 18th June 1937,* gave further facilities, without however affecting the essential clauses of the above mentioned law, the period being extended for yet another six months so that the agreements in question could be entered into. Such agreements, facilitated by the liberal *guiding principles* of the Ministry of Railways for the Regional managements of the State Railways, are still being made, though most of them have been reached. Decree No. 124 also comes to the assistance of *motorbus services,* especially when these are worked by the communes, as the tax on the tickets sold is then greatly reduced.

In addition, *order no. 125 of the 18th June 1937* relates to the application of the law of 12th April, 1935, as regards the *procedure when producing evidence of agreement with the railway* regarding the use of lorries for private transport, and defines the regulations on the *arbitrators,* who have to make such agreements, and arbitration as regards cases in litigation, resulting therefrom.

Addition to point 2 (p. 136/1936).

Law No. 81 of the 26th March 1935 on the *circulation of motor vehicles* came into force on the 1st November 1935. Its application was the subject of order No. 203 of the 19th October 1935.

* * *

2. Amendment to Chapter Two.

(Bearing of the regulations considered on the classes of motor transport.)

As *Greece* has recently joined the ranks of those countries in which motor transport is regulated by law, we give below, in the

same way as we did for Bulgaria, the effects of these regulations on the different categories of motor transport, and the definitions used therein.

To better understand what follows, it is necessary to state that the *special Greek law, published on the 30th December 1936,* also known as the « law on licensed roads », has certain analogies with the Rumanian law of the 21st July 1934, as it also contains the idea of « working the roads » by motor services (« licensed roads » or « non-licensed roads »).

When the State does not operate the road services itself, it can grant a concession for their operation to a third party, and if there is competition the concession is given in preference to the railway competed against, which in turn can hand over the concession to a private firm.

On the rest of the roads (non-conceded roads) road services can be worked without obtaining a concession so long as the firms are authorised thereto. These transport firms, however, are bound by the minimum and maximum rates fixed by the State, and are under State control.

The special Greek regulations (law published on the 30th December 1936) chiefly regulates *public* passenger and goods *transport,* but no definition is given thereof. *Private vehicles* are barely touched by the clause imposing certain conditions on their circulation on the licensed roads (see above) for public services. Moreover, the law dispenses from these conditions certain vehicles such as those owned by the diplomatic corps, vehicles used for tourist traffic, etc.

As regards *private lorries,* the law appears to treat these like lorries working transport for a third party (see below i connection with the radius of action).

The law makes no explicit distinctio between *regular* and *occasional* transpor but the clauses contained therein sho that in the case of passenger transport is primarily concerned with regular se vices worked by motorbus, and in t case of lorry transport, it would appe to neglect services with fixed timetabl and routes. The idea of *permanent temporary* services is not introduced.

As regards the *radius of action,* t law imposes no restrictions on motc bus services between two towns not mo than 20 km. (12.4 miles) apart. In t case of transport by lorry, the law stipu ates that the owners of the vehicles a free to work such transport over the censed roads (see above) for distanc of up to 50 km. (31 miles) from hea quarters.

No limit seems to be placed on lor transport over non-licensed roads.

The Greek law does not seem to affe passenger transport in *smaller vehic* (hackney carriages), but no clear distin tion is made in this connection.

* * *

Germany.

The gap pointed out in the Seco Chapter (p. 142/1936) in *German* legi ation in view of the fact that the *law the 26th June 1935* on long-distance m tor goods transport, though it explicit excluded private transport, gave no de nition thereof, was made good by the *plication order* of the 27th March 19

The *definition of private transport* ven in § 4 of this order is as follows

The following transport is to be conside as *private transport:* all transport of go for the rightful business of the firm, whet

be a question of goods bought, extracted or anufactured, either for consumption on the remises or for sale, with the reserve that ie following conditions be met:

The transport must be used solely to ring the goods into the premises, move them bout the premises, or distribute them to ustomers; the lorries must be driven by the vner himself or his employees, who must e employed by the firm in question and ot belong to other firms.

The order recognises as private transort even that *transport worked by several rms in common* if the above conditions are et, as long as all the firms in question are roducers, manufacturers or business firms nstituting a financial group. In this case e lorry must belong to one or other of em.

France.

Part I of the new *decree of the 31st ugust 1937* deals, in clause 8, with *occasional passenger transport*. A definion of such transport was given in the ecree of the 19th April 1935 and the nendment of the 25th February 1935 ee page 585/1936), in a very restrictive nse, so that according to the French gislation such services are only a small rt of the services considered occasional other countries. Occasional services e consequently taken as being those orked on request, but do not take place gularly.

According to the new decree, the relations even apply to the operators of ch occasional services (excluding, hower, those having not more than two vees each of which can carry not more an 10 persons). The decree obliges ese operators to make a statement of e journeys worked and to charge the ne rates at least when working over utes where there is another regular ad or railway service, for part of or the way.

As regards the *radius of action of motor goods transport*, the *decree of the 30th October 1935* (see page 582/1936) introducing *licences for private transport*, only affects transport worked outside an area which includes the department in which the firm has its headquarters or the carrier lives, and the neighbouring departments. Part I of the *decree of the 31st August 1937* in clause 10 divides up the public road goods services according to the limits to be finally fixed by decree into two categories : *short-distance* and *long-distance transport*.

The limits of short-distance and long-distance areas will be fixed for each centre, taking into account in each direction the size of the local railway network, the density of the traffic, and the importance of the places to be served.

The criterion of distances indirectly comes into the two other categories distinguished by the law in terms of their *characteristics* : urban and rural lorry transport. No precise definition of such transport, and therefore of short-distance transport, is given in the decree.

* * *

3. Amendment to Chapter Three.

(First attempts to regulate private goods transport by road.)

In Greece, a country now covered by the present study, the *law published on the 30th December 1936* also seems to cover private transport by lorry. The regulations, making no distinction between such transport and professional transport, stipulate that on the « licensed roads » lorries can freely work up to a distance of 50 km. (31 miles) from headquarters (see above : *2. Amendement to*

Chapter Two), while for distances exceeding this limit a fee fixed by the authorities must be paid to the concession-holder. In this case, therefore, the regulations are similar to the fiscal regulations.

Another restriction on goods road transport is to be found in the clause of the law which lays down, amongst other things, that the *total* maximum weight of loaded vehicles must not exceed 10 metric tons.

It is impossible to examine this matter in greater detail until the working of the law is better known.

Since Chapter Three was published (pages 918/1936 et seq.) Germany is the only country, amongst those dealt with in the present series, to join the first four in which private road goods transport is regulated.

Much progress has also been made in this matter in France, as well as in Austria and Czechoslovakia.

In the foreword to Chapter Three, we explained (p. 919/1936) how the analysis of the existing regulations on private goods transport by motor would be made.

We will proceed on the same lines in the case of Germany.

The *law of the 2nd July 1936, modifying the law on the transport tax* and *its application order* dated the 27th March 1936, make no distinction as regards the capacity of the vehicles used.

As regards the *radius of action,* the tax only affects long-distance transport, i.e. distances over 50 km. (31 miles) from the garage.

Except in the case of coal, lignite, coke and briquettes, which according to clause 30 of the application order are exempt from the tax in question, the regulations make no distinction as regards the *kind of goods carried,* and *no discriminati based on agreements between priv transport and the railway.*

German legislation affects priv goods transport in a simple way : a is imposed on it of 0.6 Rpf. per gr ton of goods carried per kilometre of journey. The length of the journey, h ever, is not the actual distance work by the lorry but the tariff distance tween the two railway stations near to the starting and destination poi with certain exceptions the revenue thorities are entitled to make. The stance of 50 km. (31 miles) from garage is not deducted from the len on which the tax is calculated.

The firms themselves must supply information for the tax of 0.6 Rpf. tonne-kilometre, sending in to the o ces of the Finance Department a st ment for each given period (usually e ry month) of the transport worked w a guarantee that the information gi therein is a true and proper statem of fact. The firm itself must calcul the amount due and pay this sum w the statement is sent in.

It should be noted that on the hand the kind of goods carried in e case is to be mentioned in the stateme and on the other hand copies are s to the National Statistics Office.

The « working » of the German le lation is assured by clause 30 of above mentioned order. This requires firms in question to send in to the p per Office of the Finance Departme *statement* giving the necessary data, particular the routes over which transport will be mainly worked and general nature of the goods to be carr

As for the *object aimed at* by the G man regulations on private long-dista goods transport, reference may be m

the explanation published by the Mi-ster of Finance, amongst others, in No. /1936 of the Official Transport Jour-l. This report states in a general way at the construction of the state motor ads reserved especially for long-distan- road transport justifies the imposition additional taxes, the greater part of hich can be used to meet the cost of aking these roads. Whereas in the case professional transport the new taxes e said to be motivated by a desire to ke the fiscal conditions more or less ual between such transport and the ilway, the application of the new tax private goods transport is justified on nilar grounds to those which led to the position of a tax on railway transport 1916 and 1917, which it is interesting recall :

"he introduction in Germany of taxes on vate transport of goods by rail was ught about by the advantages from ich the great mining and metallurgical cerns of Germany benefited in the matter transport, these concerns being concen-ed in certain industrial regions and en-ed with their own industrial lines, ad-tages which put them in a much favour-position with respect to industries esta-hed elsewhere and depending on the lic railway system for the transport of r raw materials. The exemption of the ve mentioned large concerns from the nsport tax falling upon other industries ld have further prejudiced the latter, ady considerably handicapped by the e favourable situation of their rivals.

t would appear that this reminder of past does not by itself completely ex-ss the objectives of the leaders of man opinion, such objectives belong-to the sphere of political economy.

Austria.

he law of the 28th July 1937 has in no wise altered the position of private goods motor transport.

France.

In some parts of Chapter Three relating to France (pp. 918/1936 et seq.) we refrained from giving the necessary details until the publication of the public administrative regulations mentioned in the decree of the 30th October 1935. As these *regulations* were published on the 16th July 1937, the following must be added.

From the point of view of the *capacity* of the lorries used, the regulations lay down that the minimum limit after which supplements will be charged is 3 000 kgr. (6 600 lb.) total weight. The idea of total weight is defined in the regulations as being the maximum weight of the lorry in working order. The information collected confirms that the weight in question includes the tare of the lorry and its maximum uesful load. The tare and this load being generally equal for average-sized lorries, it can be taken that the French regulations affect vehicles of a tonnage of 1 500 kgr. (3 300 lb.) (like the Czechoslovakian regulations), and do not restrict private transport in smaller lorries.

As regards the *radius of action* and the *kind of goods carried,* the regulations add nothing to the clauses of the decree they enforce. Nor do they introduce any *discrimination between transport according to its relations with the railway.*

The amount of the tax is fixed according to the following scale :

Vehicles whose total maximum weight in working order lies between 3 000 and 5 000 kgr. (6 600 and 11 000 lb.) : 1 000 francs.

Vehicles whose total maximum weight

in working order exceeds 5 000 kgr. (1 100 lb.) but is less than 7 000 kgr. (15 400 lb.) : 2 000 francs.

Vehicles whose total maximum weight in working order exceeds 7 000 kgr. but is less than 10 000 kgr. (22 000 lb.) : 3 000 francs.

Vehicles whose total maximum weight in working order exceeds 10 000 kgr. (22 000 lb.) but is less than 13 000 kgr. (28 600 lb.) : 4 000 francs.

Vehicles weighing more than 13 000 kgr. (28 600 lb.) : 4 000 francs plus 500 francs per tonne or fraction of tonne above 13 000 kgr.

To determine the weight, the total maximum weight in working order of the tractor vehicles, and, if need be, of the trailer or trailers coupled to it, is taken into account.

Vehicles working on electric accumulators or those with internal combustion engines working on producer gas or compressed gas are exempt from the tax for a period of two years from the publication of the decree. After this period, they will be liable to half the amount of the tax.

As regards *attenuations*, the only one is in favour of the itinerating business or industries in connection with fairs, wo are allowed a reduction of 75 % on the usual amount.

The « working » of the regulations is assured in the following way :

Every owner of a motor vehicle, liable to this tax, must, for each vehicle he puts into service, take out a special licence issued by the Indirect Taxation Administration after he has put in a statement at his local office, showing the receipt issued by the prefecture, and he must give all the information required to calculate the amount due.

The tax is payable on the issue of the special permit.

In addition, vehicles used for private goods transport whose total maximum weig in working order exceeds 3 000 kgr. (6 lb.) have to carry distinctive marks as l down by the regulations, and vehic exempt from, or not liable to, the tax m carry other fixed distinctive marks, wh show the Department in which the vehicl garage or the owner's registered offices situated.

Czechosclovakia.

Decrees Nos. 125 and 124 of the 1 June 1937, the first of which gives in tail the procedure for the application the clauses of law No. 77 of the 1 April 1935 as regards producing evide of an agreement with the railway, a on the other hand the procedure case of arbitration (see pp. 923 a 924/1936), while the second introduc a delay in the application of the supp mentary taxes, made no fundamen changes in the regulations on priv goods transport. We have already m tioned the fact that *decree No. 165 of 12th June 1936* granted an import concession as regards the radius of tion of private transport. In the fut the railway cannot refuse to come to agreement with anyone who wishes promise not to use lorries for transp ing goods more than 50 km. (31 mi (formerly the limit was 30 km. = miles).

As regards the « working » or me anism of the regulations, *decree No.* made the following precisions :

The railway *certificate* relating to agreement made is issued by the Reg al Management of the State Railways which is situated the station nearest headquarters of the petitioner.

For exemption from the suppleme ry tax, this certificate must be produ before the beginning of the financial riod (half year) and it is also valid

ne following periods unless the agreement be cancelled.

However, for the application of these egulations, *decree No. 124 of the 18th une 1937* provides for an attenuation in hat for the second half of 1937 the supplementary tax is not payable if the petitioner can prove within the first two months of this half year that he has at last begun negociations with a view to making the agreement in question.

His lorries become liable to the tax on he 1st January 1938 if he cannot produce evidence of an agreement with the ailway before that date.

The complete Czechoslovakian legislation on private goods transport therefore ill only come into force on the 1st January 1938.

Decree No. 125 of the 18th June 1937 xed in detail the procedure to be followed by the arbitrators called upon to assist in reaching the agreements (see p. 23/1936) when the railway and the lorry owner are about to enter into an agreement and have recourse to arbitration. s was said (p. 923/1936) such arbitration must cover certain clauses of the understanding on which complete agreement cannot be reached between the two arties concerned. It is stipulated, mongst other things, that the arbitrator ominated by the Minister of Finance hould superintend the work of the arbitrators and that the latter must, before ronouncing sentence, if need be, hear he parties and make verifications at the ost of the party requiring them.

The above-mentioned decree also gives e necessary precisions on the procedure at the *Court of Arbitration* called upon to settle litigation resulting from the pplication of such agreements. This urt also consists of three members nominated by the same Ministers as in the case of the arbitrators mentioned above. The president of the court is nominated by the Minister of Finance.

The parties concerned can be represented at the Arbitration Court by proxy freely chosen and given full power to act on their behalf. Before passing sentence, the Arbitration Court must elucidate the points on which the litigation has arisen, and if need be it can call upon witnesses and technical experts for this purpose. Its sentence is legally binding.

* * *

4. Amendment to Chapter Four.

(Right to a State Monopoly as regards motor transport.)

The *Greek legislation* (law published on the 30th December 1936) would seem to confer a sort of State monopoly as regards suburban passenger and goods road services.

All suburban services for the transport of passengers, goods, products, and in general the transport of any object whatsoever, comes under State control, the State being entrusted with the investigation into, and the organisation of, all road services.

The idea of *licensed roads* which comes into the Greek law also seems to strengthen the impression that the latter is based on the idea that on certain roads the State shall have a monopoly of the road services, for the operation of which it can grant a concession to a third party for a maximum period of five years, if it does not wish to take up the concession itself. The rest of the road system (non-licensed roads) can be worked over without concession, but individual carriers must be authorised to do so.

* * *

5. Amendment to Chapter Five.

(Special conditions in the motor transport regulations applied to State Railway or Post Office operated public road services.)

Except in Greece, the new legal instruments regulating motor transport dealt with in this article have in no way changed the essential facts reported in the fifth chapter. Only the *German law of the 2nd July 1936* extending the transport tax to road transport exempts therefrom the passenger services worked by the State Railways or Post Office.

Greece.

The Greek legislation does not prevent the State from participating in the field of public road transport; on the contrary, a great part thereof is reserved for the State. There appears to be a tendency to extend such participation even further. The regulations enumerate three ways of working public road services, and add :

« Existing communications are worked under the three systems in turn, so that by degrees the whole will come under the State management... »

Amongst the three systems there is first of all direct operation by the State. In this case, however, the State can authorise the Hellenic State Railways to undertake the operation on their behalf. When the concession is granted to a third party, the State reserves the right to operate its own services if the concession for the operation is granted to a railway competed against by a road service and this railway decides to cede the operating to a third party.

As regards the legal authorisation granted to the State Railways to operate road services, we would refer our readers to the case mentioned above. Except in such a case, no special preference seem to have been given the State Railway: The Greek legislation does not mentio the Post Office as operating any publi road services.

As regards the effective participatio of the Hellenic State Railways in th field of road transport, the Statistics c the International Railway Union (*Bull tin de l'U.I.C.*, September 1937) show th situation as follows :

The Hellenic State Railways, in 1936, wer using 156 vehicles in passenger services an 61 vehicles in goods services; the length lines worked by the State Railways them selves was 1 044 km. (649 miles) in th case of passenger services, and 1 019 km (633 miles) in the case of goods services.

* * *

6. Amendment to Chapter Six.

(Special regulations for certain classes public road service operators.)

The new regulations dealt with in th present article do not involve any esse tial innovations under this heading, e cept in Greece.

There is only the *French decree of th 8th July 1937* which exempts from t tax vehicles used for a public passeng service subsidised by a Department, a providing a service between places in tw neighbouring Departments.

Greece.

The Greek law published on the 30 December 1936 stipulates that in the ca of the concession of a road service to third party, when the road service co petes against the railway, preference to be given to railway undertakings w can either operate the service themselv or cede the operation to a third party, the State does not wish to operate itse

27th September 1937.

MISCELLANEOUS INFORMATION.

[621 . 132.3 (.73)]

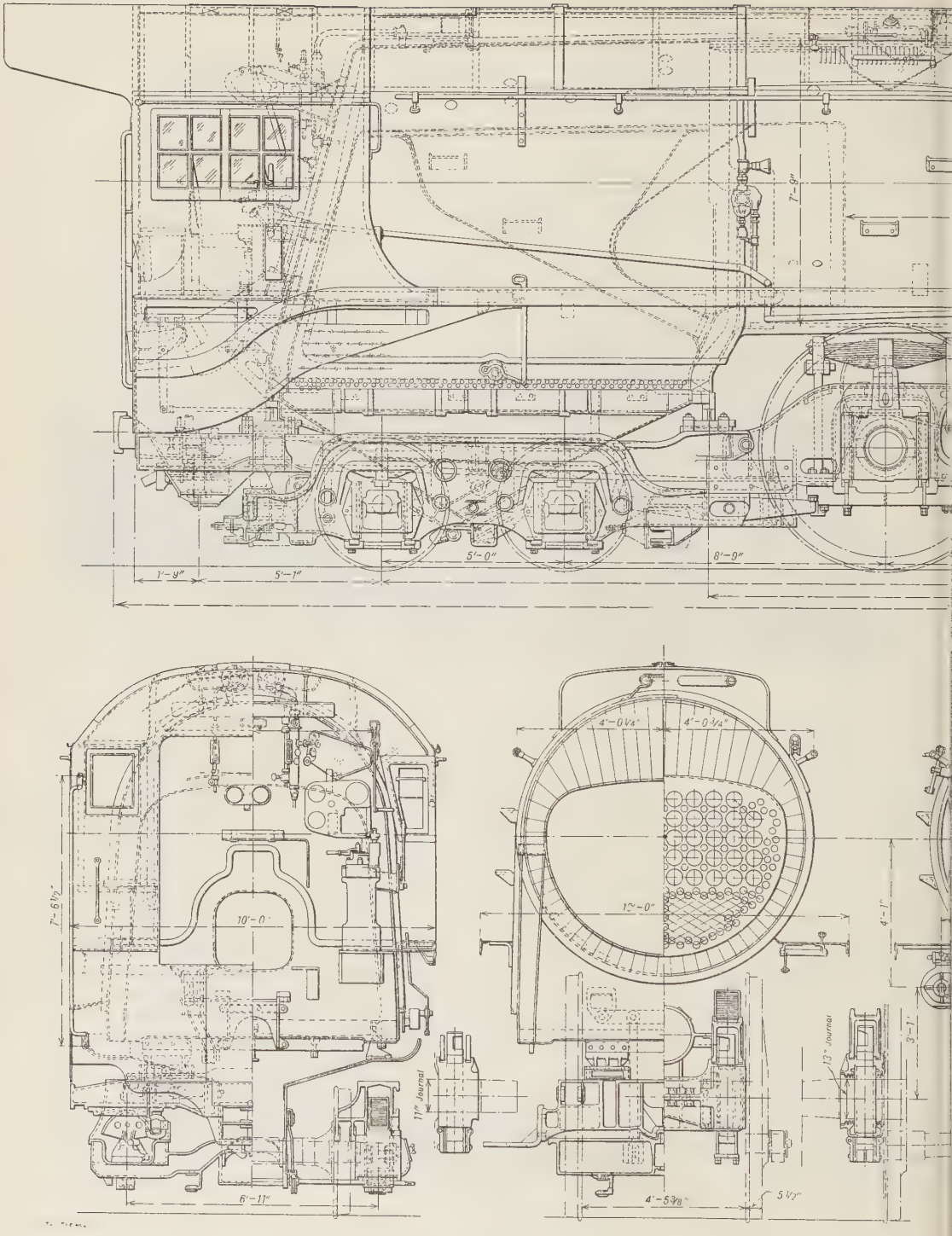
1. — New streamlined 4-6-4 locomotives,

New York, New Haven and Hartford Railroad.

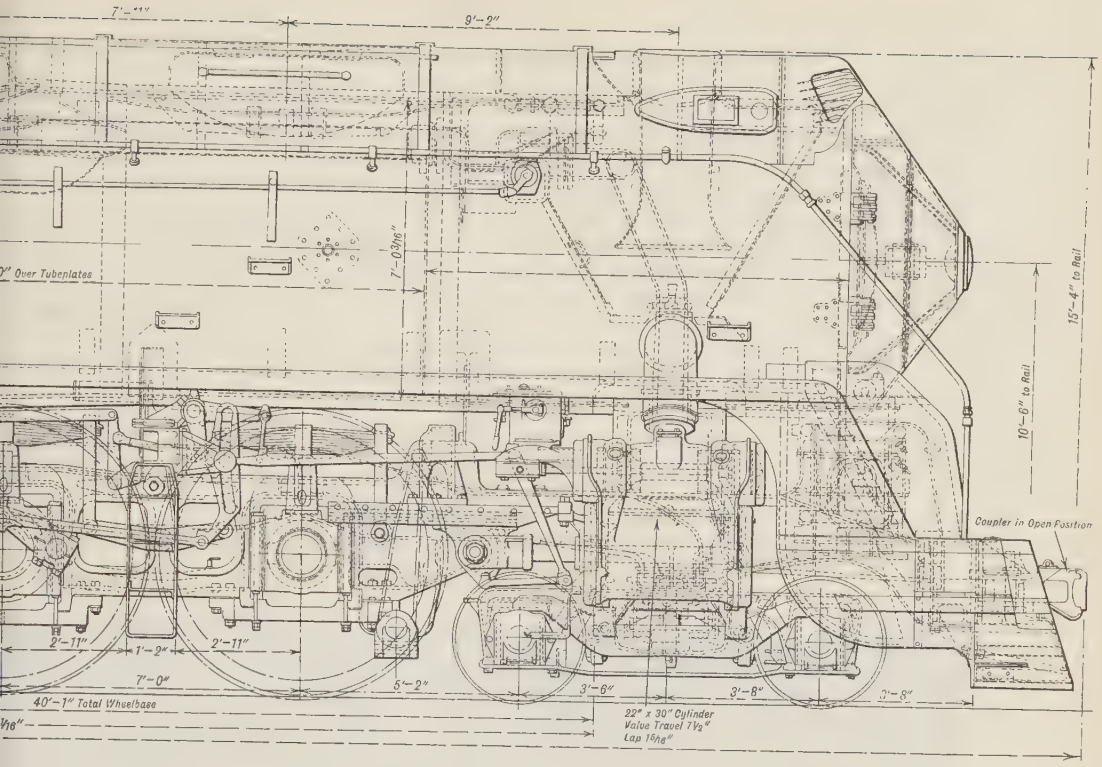
(The Engineer.)

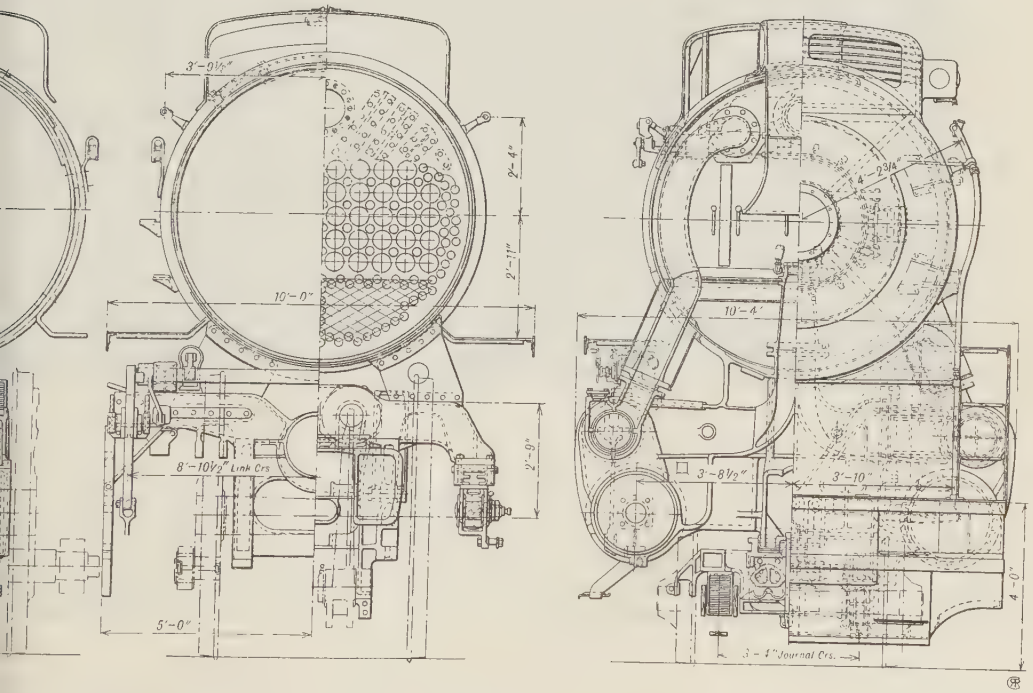
Ten new partially streamlined locomotives, built by the Baldwin Locomotive Works, have recently been placed in service on the New York, New Haven, and Hartford Railroad, in the United States. These engines were specially designed and built for fast passenger services between Boston and New Haven on what is known as the Shore Line, and have been named after the route upon which they will work. There are no very heavy gradients on the Shore Line, but it contains a number of sharp curves. Hitherto the service has been mostly maintained by 4-6-2 *Pacific* engines built in 1916, but of recent years their capacities have been severely taxed to keep to the schedule of about 3 h. 15 m. for the 156.8 miles with four to seven stops and hauling from fourteen to sixteen coaches.

In designing the new engines a number of important facts had to be considered. It was not thought advisable to exceed three pairs of coupled wheels. Ample boiler capacity was necessary to provide sufficient steam at high speeds and give economy in fuel combustion. A locomotive was required which could be used, not only on the Shore Line, but also, in case of necessity, between New Haven and Springfield, where the axle loading is more restricted. Rapid acceleration was essential because of the stops and the large number of speed restrictions on the route, where trains are frequently slowed down to about 40 miles an hour and it is necessary to get speeds of over 70 miles an hour back quickly to maintain the tight schedule. The ruling gradient of the Shore Line is encountered approaching Sharon Heights from the east, where for a distance of over 5 miles the ascending gradient varies from 0.6 to 0.7 per cent. The engine required would have to be capable of maintaining a speed of at least 60 miles an hour on these gradients when hauling twelve coaches aggregating 830 tons. The railway company did not possess a locomotive with sufficient power to give the required tractive force, and a series of tests were made with



New York, New Haven and Hartford Railroad





ive — Baldwin Locomotive Works, Philadelphia.

two of the existing *Pacific* engines hauling a twelve-coach train. By means of a dynamometer car the aggregate tractive effort of the two engines was measured when hauling the train uphill at the required speed. The results were corrected to allow for the excess resistance of the extra locomotive and the results plotted. As a result of these investigations it was decided to build locomotives of the 4-6-4 type, illustrated herein.

The new engines present a very clean cut and workmanlike appearance, the lines from the headlight set in the apex of the coned front of the smoke-box cover being carried back over the top of the boiler flush with the top of the chimney and on over the driving cab. The shrouding encloses all the projections along the side of the boiler, and from the lower front part of the smoke-box an apron has been formed over the coupling gear and carried down in front of the bogie. A 6 in. wide strip of stainless steel, which has been carried along the running board and curved down under the cab, increases the streamlined appearance. It will be noted that the streamlining has not been carried so far as the covering any of the main moving parts, all of which are easily accessible for inspection.

The engines have an overall length of 53 ft. 10 1/2 in., with a driving wheel base of 14 ft. and a total wheel base of 40 ft. 1 in. An unusual appearance is presented by the 80 in. diameter driving wheels, which have very deep tires and 72 in. diameter cast steel centres. These centres only leave a narrow annulus pierced with holes, the wheels having no spokes. Carbon vanadium steel has been used for the driving wheel axles which run on 13 in. diameter rolling bearings on the main axle and 11 in. diameter roller bearings on the front and back axles. Five of the engines have Timken, and five S. K. F. roller bearings. Carbon vanadium steel has also been used for the crank pins and the main and side connecting-rods. The back end of the main connecting-rod and the main pin connection of the side rods are fitted with floating bushes of brass set in outer bushes of gunmetal.

The frame bed casting with saddles, cylinders, front bumpers, cradles, brackets, etc., was cast in one piece and after machining weighs 46 650 lb.

With the engine in working order the weights are distributed as follows : Driving wheels, 193 000 lb. ; front bogie, 71 500 lb. ; trailing bogie, 100 800 lb. ; total engine, 365 300 lb. ; tender, 332 000 lb.

The boiler is designed for a steam pressure of 300 lb. per sq. in., whilst the actual working pressure is 285 lb. per sq. in. The barrel consists of three nickel steel rings and a smoke-box ring, the front boiler ring having a diameter of 82 7/16 in. The ticknesses of the rings are 7/8 in., 31/32 in., and 1 in. respectively and the throat sheet and back head are 13/16 in. and 7/16 in. thick respectively. The radially stayed fire-box is welded throughout and is 132 in. long, 84 1/8 in. wide at the grate, and the combustion chamber extends 42 in. into the barrel. Three thermic siphons extend from the throat to the crown sheet, giving additional direct heating surface with improved water circulation and, at the same time, forming supports for the fire-brick arch. The grate has an area of 77.1 sq. ft. Heating surfaces are as follows : Fire-box and combustion chamber, 341 sq. ft. ; siphons, 139 sq. ft. ; tubes and flues, 3 335 sq. ft. ; superheater, 1 042 sq. ft. ; total, 4 857 sq. ft. At 85 per cent working steam pressure the engines have a tractive force of 44 000 lb.

The two cylinders are 22 in. diameter by 30 in., and Walschaerts valve gear is employed, with 11 in. diameter piston valves having a maximum travel of 7 1/2 in. Two force feed lubricators are fitted to each engine, the lubricator on the right side serving the cylinders, steam chest, and stoker engine ; that on the left side distributes oil to the valve stems, crossheads, main guides and crossheads, and the driving box pedestals.

Firing is done by means of a mechanical stoker of the Standard Stoker Company's « H. T. » type. In this type of stoker a trough runs the length of the bottom of the tender and in this trough an archimedean screw feeds the coal forward through a crusher. After being broken down to size the coal is carried to the grate door by another screw conveyor, which

entirely cased in. The variation in the oscil-tion of the engine and tender when travelling nd the angle through which the coal has to e lifted to the grate door are compensated in ie conveyor by a central section, at either end which is a universal joint. A small steam gine fitted in a compartment on one side the front part of the tender drives the stoker. To obtain access to the smoke-box, which has e usual type of hinged front, the apex of the ne of the shrouding is hinged and may be swung open upon the release of four clamps holding it in position.

The shrouding along the boiler is built up upon a series of light flat sectional transverse frames. The smoke lifter, which completely encloses the chimney, has louvre openings in the front and a wide horizontal slot in the top of the casing at the back of the chimney.

The tenders, which are carried on two six-wheeled bogies, have a capacity for 18 000 gallons of water and 16 tons of coal.

[656.215 (.75) & 656.259 (.75)]

2. — Floodlights at highway crossing.

Installation on Missouri-Kansas-Texas supplements flashing-light signals.

(Railway Signaling.)

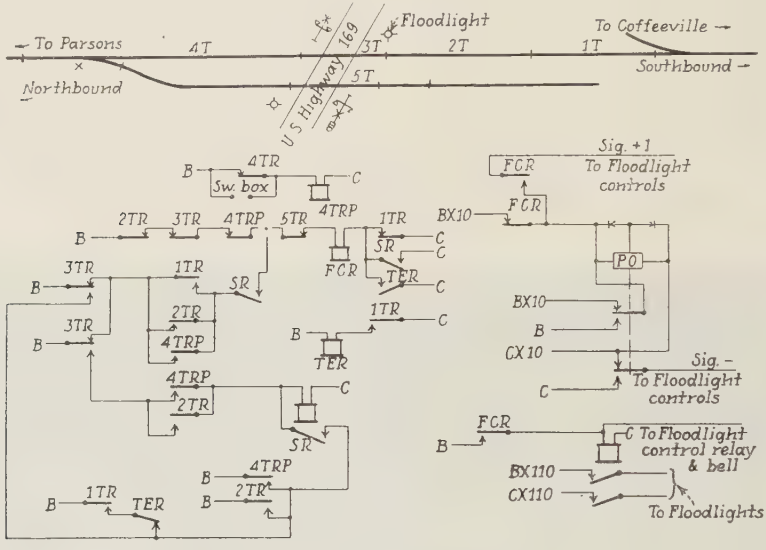
n order to provide additional protection at a ssing of a highway with tracks frequently structed by switching moves at night, the ssouri-Kansas-Texas has installed floodlights, addition to standard flashing-light signals, at rossing of highway U. S. 169, about 1.5 miles th of Coffeyville, Kan.

Special conditions.

The highway is straight for some distance on each side of the crossing, with practically level grade about 3 ft. below the grade of the railroad at the crossing, so that the lights of an automobile approaching the crossing fall below the top of the rail until within about 100 ft.

from the track. Railroad traffic consists normally of 4 passenger trains and about 22 freight trains and switching movements daily. Switching movements or slow-moving trains when entering or leaving the yard frequently occupied the crossing for extended periods.

The accident record indicated that the hazard caused by unlighted freight cars standing on



Track layout and principal circuits.

or moving slowly over the crossing was a real one and was a factor in a majority of the accidents occurring there.

Plans of the State Highway department contemplate eventual rerouting of the highway, which will eliminate the greater portion of the heavy traffic over this crossing, as well as over one additional crossing of a city street. For this reason grade separation at the present location was not economically feasible. In order to provide more protection and better illumination of the crossing until relocation of the highway could be effected, it was decided to install flashing-light signals and floodlighting. This protection consists of flashing-light signals, with a crossing bell, supplemented by floodlights to illuminate the sides of trains on the crossing. The flashing-light signals are of the standard type as recommended by the Association of American Railroads Joint Committee on Grade Crossing Protection in its *Bulletin* No. 2.

Arrangement of lights.

The two floodlights each consist of an en

closed weather-proof floodlighting projec employing a 500-watt electric lamp equipp with external visors and mounted on a st hinged pole, 23 ft. above the top of the r and located 25 ft. from the center lines of t railroad track and the highway, respective The beam is directed downward and to the so as to illuminate the side of a locomotive car on the crossing and to face the left-ha side of an approaching train. The beam directed at such an angle to the highway a at such an angle below the horizontal, t glare is eliminated, both to the motorist a to the engineman. Actual tests made at Cof ville during recent months show that the dri of an automobile can see a train occupying crossing from a point a half mile from

rossing. Cars are plainly visible from a dis-ance of 1 500 ft.

Track layout.

The tracks involved at the crossing are a ingle main-line track and a siding, which joins he main-line north of the crossing. A turnout witch is located in the main line south of the rossing just beyond the northbound track cir-uit controlling the protection at the crossing or northbound train movements. A short rack circuit over the crossing provides protec-ion when this portion of the siding is occupied. The main-line track is provided with one pproach control track circuit on the north and wo on the south, with a separate track circuit ver the crossing to obtain positive protection henever the main track at the crossing is ccupied. The floodlights are controlled over master crossing relay so as to be lighted only hen a train is approaching and occupying the rossing. Directional cut-out when the rear of train leaves the crossing is obtained by the se of a special stick relay. The protective de-ices at the crossing are cut out while switch-ng movements are being made at the turnout outh of the crossing, by using a time-element elay which picks up 1 1/2 minutes after the rst approach track circuit controlling protec-tion for northbound moves is shunted. Protection is cut in again as the train proceeds over the crossing when the second track circuit in approach to the crossing is shunted. Movements into or out of the siding at the siding switch north of the crossing are prevented from causing unnecessary operation of the protection devices by picking up a repeating relay for the south-bound approach control track relay over a contact on the switch circuit controller closed when the switch is reversed. The control circuits are shown in the accompanying diagram. An interesting construction feature of this installation is that the instrument cases are placed 4 ft. 9 in. above the rail. This was done because, during the floods of 1927, flood water rose to a depth of 42 in. at this crossing.

Division of costs.

The protection was installed by the signal forces of the railroad and all costs of installation were borne by the state with federal funds as a United States Works Program Grade Crossing Project under the Emergency Relief Appropriation Act of 1935. The operation, maintenance and renewal of the flashing-light signals are handled and paid for by the railroad company, while the maintenance and operation of the floodlights is handled and paid for by the state.

Victor TONDELIER.

OBITUARY.

Victor TONDELIER

Former President of the Permanent Commission of the International Railway Congress Association,
Former President of the Executive Committee, Belgian State Railways.

We have heard with the deepest regret the death, on March 3rd, of Mr. Victor ONDELIER, former President of the Per-anent Commission of our Association, id former President of the Executive ommittee of the Belgian State Railways.

Born at Malines, in 1851, Mr. Tondelier as an excellent scholar, and was gra-uated a civil engineer (Bridges and ighways) at the Ghent University. He ined the Belgian State Railways Ad-inistration, to which his father also be-nged, and he made a brillant career, ie principal stages of which are as un-er.

Mr. Tondelier started, at Malines, on eptember 3rd, 1873, as assistant engi-eer in charge of the first section of the t Way-and-Works Division.

As early as July 1st, 1876, he was trans-rred to the Headquarters, as an assist-t at the Way-and-Works Department, d was appointed an engineer on June th, 1877. He was soon placed in charge the Office for research and investig-ions into technical matters, and he im-ediately distinguished himself by his ility and untiring activity.

On December 1st, 1879, he was trans-rred, as assistant, to the 1st Way-and-orks Division of the Belgian State Rail-ys, but he rejoined the Headquarters March 8th, 1881, in charge of the Ac-dents Office.

After such extensive training, under guidance of able chiefs, Mr. Tonde-red, as assistant, to the 1st Way-and-orks Division, at Binche, on November h, 1881, being barely 30 years of age.

He was afterwards in charge, successively, of the Liége, Antwerp, and Brussels (North) Divisions of the Way-and-Works Department.

On June 7th, 1901, Mr. Tondelier was appointed Inspector General at the Traffic Department, and Director on June 30th, 1906. On January 1st, 1906, he succeeded Mr. Garnir, as Head of the Traffic Department.

Finally, on December 12th, 1912, he was appointed President of the Executive Committee of the Belgian State Railways.

After the war, Mr. Tondelier was responsible for the restoration of the System, and he only retired on July 7th, 1921, at the age of 70, after nearly 48 years of service.

At the pressing request of the then Minister of Belgian Railways, Mr. Tondelier continued for nearly four years to lend his valuable assistance to the Department, in order to pursue negotiations concerning the buying up of railway concessions, and other important questions.

In 1909, Mr. Tondelier was appointed a member of the Permanent Commission of the International Railway Congress Association, and after the death of Mr. Arthur Dubois, in 1913, he became President of the Association.

When proposing him for the Presidency, at the Meeting held by the Permanent Commission on July 5th, 1913, Mr. Ramaeckers, who was in the Chair, spoke as follows :

« Mr. Tondelier, President of the Executive Committee of the Belgian State Railways, is undoubtedly one of our most

experienced, hard working and distinguished engineers. He was graduated about forty years ago as an honorary engineer (Bridges and Highways), at the Ghent University, and took his place straightaway among the railway engineers. I witnessed his first steps and followed him up in all the stages of his career, mostly spent in the technical branch. I can vouch that, whatever post he held, he always fulfilled his task in the most distinguished manner. At all times, he did a considerable amount of good work and he did it quietly, with all due modesty, and without any feelings of personal interest. Before he was made the President of his Administration, he brilliantly managed for several years the important Traffic Department. This amounts to saying that he is fully competent to preside over the work of the Congress in all branches of its activity. I feel quite sure that, like his eminent predecessors, he will be able to firmly maintain the pure and sound traditions of friendly brotherhood upheld by the Congress, and that he will soon deserve your entire confidence and your unmixed sympathy. »

It is under Mr. Tondelier's tenure, at the Rome Congress, in 1922, that our Association was reconstructed under its present name and that the final rules and regulations were drawn up, and his assistance was much appreciated while these delicate questions were being discussed. He also took a leading part in the organisation of that Session.

In the management of the Association's business, as well as when carrying out his duty of President of the Permanent Commission and of its Executive Committee, he spared no pains, and his tactful disposition as well as his straightforwardness, together with his great affability and charming modesty, were much appreciated by all those who came into contact with him.

Mr. Tondelier resigned from the Presidency of our Association in 1925, much to the regret of all his Colleagues of the Permanent Commission.

The highest Belgian and foreign honours were bestowed on Mr. Tondelier in the course of his brilliant career. He was successively made a Knight, Officer, Commander and Grand Officer of the « Ordre de Léopold ». He also held such high honours as Commander of the « Légion d'Honneur », the Victoria Cross, the Order of the Crown (Italy), and the order of Orange-Nassau.

His last years were darkened by the tragic death of his only son; his stoicism enabled him to resist this terrible blow without ever complaining.

We wish to convey our heartfelt sympathy to Madame Tondelier and family.

The Executive Committee.